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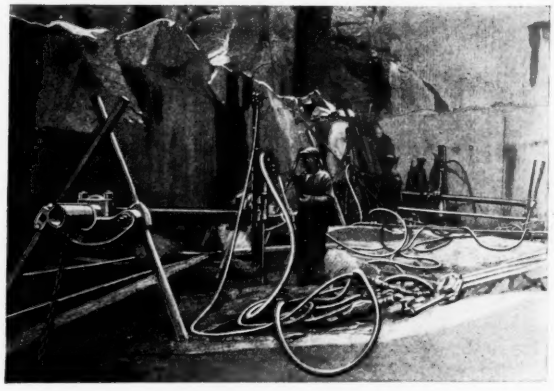
Pneumatic Hose

Hose for Tire Inflation–Steel Cutting and Welding–Tool Operation–Railway Brake and Signal Service–Sandblast and Cement Gun Work–Divers' Air Line Hose

Webster Norris

A MAJORITY of the innumerable articles manufactured from rubber can be classified as products of the mechanical rubber goods section of the industry. Hose, belting, and packing, however, constitute the bulk of the tonnage of rubber goods for industrial purposes. Hose for pressure or vacuum is available for handling hot or cold fluids of every quality and description. It is probably true to say of hose, therefore, that it has more numerous applications than either belting or packing.



N. Y. Belting & Packing Co.

Fig. 1. Air Hose in Rock Drilling

Diversity in use naturally implies diversity in quality, construction, and dimensions, or, in other words, specialization. There are, consequently, special types of hose, each designed for a purpose. Broadly speaking, one such group is that for general pneumatic and gas service. Under this designation can be included pressure hose for tire inflation, air blowing, gas connections on apparatus for welding and cutting metals, pneumatic tool operation, railway air brake and air signal service, sandblast and cement gun work, divers' air lines, etc.

For these and similar purposes where air or gas is conducted by rubber hose, flexibility and strength are the typically essential features of the construction. These characteristics are naturally supplemented by those necessary qualities of tube and cover composition that will insure adequate service under special working conditions. Thus specialties arise in every type of hose according to adaptation.

Ordinary Air Hose

Service station and garage air hose for tire inflation and general use in blowing away dust is always made small, light, and flexible, and portable for convenience in applying the air pressure in close situations. The common sizes and plies used for this work are ¼- and ⅝-in. by 5 ply, or ⅜- and ½-in. by 6 ply. The highest grades of this hose are of all-braid ply construction to secure maximum flexibility, light weight, and freedom from kinking. It will carry high pressures and successfully resist the abrasive action of constantly being dragged about over concrete floors and sidewalks.

Special hose similar in sizes and general flexibility is used for conducting oxygen and acetylene gas on metal welding, cutting, and decarbonizing apparatus. Hose tube for this service is specially compounded to withstand the deteriorating effect of the chemically active gases.

Allied to air hose is so-called cloth insertion hose for use on fire extinguishers, beer pumps, etc. Its internal diameter runs from ⅛- to 1 in. The fabric construction is made of sheeting of weights appropriate to the size and the working pressure desired.

Pneumatic Tool Hose

Pneumatic hose of the trade serves to conduct the pressure between the air compressor and the pneumatic tools on which modern mining and steel construction so largely rely. In mining, quarrying, road and rock cutting generally, air operated rock drills depend on a good air hose connection. Rock drilling is always done under conditions that expose the air hose to excessive abuse; for not only is the air pressure high, but the hose is constantly in contact with earth and sharp rocks among which it is pulled about, thus damaging the hose cover by cuts and abrasion.

The use of air hose in rock drilling is one of its principal applications. Similarly hard service conditions occur in mining, quarrying, and erecting steel buildings, ships, and bridges where pneumatic riveters and hammers are employed. In all of these situations good flexibility is essential to insure convenience in handling and freedom from kinking.

Pneumatic tool hose is an example of extreme flexibility which is obtained by making all plies braided with no duck plies in the construction which is bound together by high grade friction. All braided construction is reserved for the highest quality hose. The tube must be of a quality that will not harden or crack with age and will withstand well the presence of oil from the compressors as may come in contact with it.

To guard the hose against abrasion in particularly severe service special wear resisting rubber cover stock is required of the type of tire-tread stock, often further protected by spiral or woven wire armor.

Thermoid Company

Fig. 2. Air Hose

The physical test requirements for pneumatic hose for United States government service are shown in the accompanying tabulation.[1]

PHYSICAL TEST REQUIREMENTS—U. S. PNEUMATIC HOSE

Size					
Inside diam. ..... *in.*	7/16	5/8	3/4	1	1 1/4
Outside diam. ..... *in.*	1 1/16	1 5/16	1 7/16	1 13/16	2 1/16
Tolerances					
Inside diam., plus or minus..*in.*	1/32*	1/32	1/32	1/32	1/32
Outside diam., plus or minus..*in.*	1/32	1/32	1/32	1/32	1/32
Thickness					
Tube, min. ..... *in.*	3/32	3/32	3/32	3/32	3/32
Cover, min. ..... *in.*	1/32	1/32	1/32	1/32	1/32
Fabric plies, min..	4	4	4	5	5
Hydrostatic Test Pressure. Coupling and imperfection test, min. *lbs. per sq. in.*	250	250	250	250	250
Burst test, min ..*lbs. per sq. in.*	650	625	625	600	575
Friction*					
Cover and plies, min.....*lbs.*	15	15	15	15	15
Tube and plies, min.....*lbs.*	15	15	15	15	15
Between plies, min.....*lbs.*	20	20	20	20	20
Tensile Strength†					
Tube, min. .....*lbs. per sq. in.*	1,700	1,700	1,700	1,700	1,700
Cover, min. .....*lbs. per sq. in.*	1,500	1,500	1,500	1,500	1,500
Ultimate elongation, tube, min...*in.*	2–11	2–11	2–11	2–11	2–11
Cover, min. .....*in.*	2–10	2–10	2–10	2–10	2–10
Set					
Tube Stretch, 10 min.....*in.*	2–10	2–10	2–10	2–10	2–10
Cover Stretch, 10 min.....*in.*	2–9	2–9	2–9	2–9	2–9
Set after 10 min. rest, max.....%	25	25	25	25	25

* The rate of separation shall be not greater than 1 in. per min. under the specified loads.

† The tensile strength of tube and cover, after being subjected to an accelerated aging test of 96 hrs. in dry air at 158 + 2° F., shall show a decrease from the tensile strength determined before heating of not over 25 per cent.

Air Brake and Signal Hose

Practically all air brake and air signal hose is made according to specifications of the American Railway Association. These detail dimensions, quality, and construction of the goods and prescribe methods of test for checking the quality of the rubber parts and the fabric. The air brake and air signal hose required for equipment of the railways of the United States is estimated at 5,950,000 pieces of air brake and 255,000 pieces of air signal hose. The technical qualifications required for acceptance of these goods are so exacting that they can be met only by closely controlled manufacturing methods in a well-organized and specially equipped department.

Two tests of railway air hose of especial practical significance are those of porosity and bursting. Evidently the ability of air hose to retain the working pressure without loss or bursting is of prime importance; therefore tests are prescribed for porosity of the rubber tube and for bursting strength of the hose itself. The porosity test is performed with internal pressure on the hose submerged in water and the cover cut through from end to end to permit observation of the escaping air if the tube proves porous under the pressure applied.

Following the test for porosity the bursting test is applied. First, under hydraulic pressure of 200 lbs. per sq. in. the hose is not to expand more than 3/4-in. for air brake hose and 1 1/16-in. for air signal hose nor develop any small leaks or defects. After this test the same hose section must stand 500 lbs. per sq. in. for 10 min. without bursting or defects; after which test the pressure is increased to 700 lbs. per sq. in., at the rate of not less than 100 lbs. or more than 200 lbs. per 5 sec. without bursting the hose.

Divers' Hose

Air line hose for submarine divers' use, while possessing very little general trade interest, has nevertheless great special importance. It is made with strictest regard to quality and construction. Its manufacture is practically confined to very few companies because it is not a competitive line and the demand for it is limited. Divers' air line hose is generally made 1/2-in. inside diameter. The tube and the cover are of the same light gravity compound but not necessarily a floating stock. In fact the sinking type is specified by the Federal Specifications Board for government divers' service. It is essential, however, that the tube stock be non-blooming so that there may be no free sulphur present to attack the eyes of the diver. The wall structure of the hose must be sufficiently rigid to prevent kinking and hinder the free passage of air. There is no general standard gage of tube and cover. Some manufacturers make the hose 5-ply with .102-in. tube thickness and .063-in. cover; while others make 7-ply hose with tube 1/16-in. and cover 1/32-in. thick.

The quality, the construction, and the chemical and physical requirements for United States government divers' hose are here quoted from the Master Specification.[2]

GRADE AND TYPE. Hose shall be of a single grade and of the "sinking" type.

MATERIAL AND WORKMANSHIP. Hose shall be free from defects in material and workmanship.

GENERAL REQUIREMENTS. (1) Construction. Hose shall consist of an inner rubber tube, 3 plies of braided cotton reenforcement, well imbedded in a rubber compound, and an outer rubber cover. Length of hose shall be as specified in the proposal, and each end shall be capped with a rubber compound 1/16-in. thick of the same composition as the tube. (2) Tube and Cover. Tube and cover shall be smooth (the tube absolutely smooth), free from pitting, and of uniform thickness. (3) Cotton Reenforcement. The reenforcement shall be evenly and uniformly braided, and as free from unsightly defects, dirt, knots, bumps, and irregularities of twist as is consistent with the best manufacturing

[1] Federal Specification ZZ-H-491, Jan. 6, 1931.

[2] Federal Specifications Board, Specification No. 44 b, revised Sept. 16, 1925.

practice. (4) Couplings. Each length of hose shall be fitted with couplings as specified in the proposal. Couplings shall be well secured in place by a high grade rubber cement and 3 metal clamps. Female couplings shall be fitted with a leather washer ⅛-in. thick.

DETAIL REQUIREMENTS. (1) Physical. Hose shall meet all requirements stated in the following table. (2) Chemical. Tube and cover shall contain not less than 70 per cent by volume of the best quality new wild or plantation rubber, nor more than 1½ per cent of waxy hydrocarbons. The rubber compounds shall be free from all substances which might injuriously affect their quality.

PHYSICAL TEST REQUIREMENTS—U. S. DIVERS' AIR LINE HOSE

Size, inside diam.	*in.*	½
Outside diam.	*in.*	1 1/16
Tolerance, inside diam. and outside diam., + or —	*in.*	1/32
Length	As specified in proposal	
Tolerance		
50-ft. length, + or —	*in.*	2
3-ft. length, + or —	*in.*	1
Hydrostatic Test Pressure		
Coupling test	*min. lb. per sq. in.*	250
Burst test	*min. lb. per sq. in.*	1,000
*Friction	*min., lb.*	15
†Tensile Strength		
Tube	*min. lb. per sq. in.*	1,400
Cover	*min. lb. per sq. in.*	1,200
Ultimate Elongation		
Tube and cover	*min., in.*	2–10
Set, Tube and Cover		
Stretch 10 min.	*in.*	2–8
Set after 10 min. rest	*max., %*	25

* The rate of separation shall not be greater than 1 in. per min. under the specified load.

† The tensile strength of tube and cover, after being subjected to an accelerated aging test of 96 hrs. in dry air at 158 ± 2° F., shall show a decrease from the tensile strength determined before aging, of not more than 40 per cent.

Sandblast and Cement Gun Hose

Two industrial purposes to which air hose of special construction is applied are sandblasting and cement construction. Sandblasting consists in discharging abrasive material by air pressure against surfaces to clean or sculpture them. Common among sandblasting applications are cleaning castings and forging, ships' hulls, tanks, etc., preparatory to painting or other treatment, lettering monumental work, frosting glass, cleaning buildings, and many other jobs of abrasive work. Compressed air is the power ordinarily used though steam is used in some operations.

The power of compressed air to discharge the abrasive is applied in 2 general ways. These are by direct pressure system, whereby the air and the abrasive are combined in and discharged from a sealed container through a rubber hose and nozzle; and the suction and gravity system whereby the abrasive is introduced into the air stream at or near the point of combined discharge.

The abrasives used may be sea sand, silica sand, or metallic abrasives such as chilled steel shot and angular grit. The kind of abrasive is selected by working tests to secure the greatest capacity. In any event the tube of the sandblast hose is subjected to severe erosion to resist which it must be of extremely high quality. The quality and the thickness of the hose tube are most important in determining its life. The tube consists largely of pure gum. Its usual thickness is ⅛-, $\frac{3}{16}$-, and ¼-in. The hose is also regularly made with 4 plies of heavy duck with a friction corresponding in quality with the tube and cover. The latter is properly of the same grade as the tube and $\frac{1}{16}$-in. thick. The ends of the hose are heavily capped with rubber. The range of sandblast hose sizes are from ¾- to 3-in. in multiples of 5 up to 50 ft.

U. S. Rubber Co.

Fig. 3. Flexible Air Drill Hose

The remarks in reference to sandblast hose construction apply also to cement gun hose except that occasionally this hose is made with 3 plies of duck or with fabric outside the rubber cover because of the less strenuous service to which it is employed.

The hose grouped in this article are those designed for applying air pressure industrially for a number of important industrial uses particularly where air pressure is employed for operating machinery in mining, building, railway, and submarine service.

Foreign Branch Factories Warranted

IT IS hard to understand why critics of American enterprise overseas should pick on tire manufacturers particularly for establishing branch factories in foreign countries. Producers of rubber goods have not done anything more censurable than over 2,000 other American manufacturers who have felt the urge or the necessity to make additional wares abroad after having amply provided for the home market while foreign fields present opportunities for supplementary business. It has been claimed that such diversion of capital not only increases unemployment but decreases purchasing power in the American market through the payment of millions to foreigners that Americans might be receiving, and floods the United States with the products of foreign "sweated labor," thus inducing a condition which American tariff was to avert.

But objectors to the extension of American industry seem to overlook the fact that when foreign tariffs are so prohibitive that goods made here cannot be profitably sold abroad, manufacturers have no alternative but to set up factories within such tariff walls or quit doing business abroad. Even were American factories to employ more workers at home and so to economize on production cost as to meet foreign tariffs, there is no assurance that the excess output could be marketed abroad. The lower purchasing power of foreigners, national prejudices, trade cartels, and other factors would still have to be combatted. The factory on the ground and paying wages and taxes locally makes "invasion" less objectionable. As for flooding the American market with pauper-made goods, that is not being done, or is it likely to be done, least of all in the case of rubber manufactures.

Obtaining the Most from Rubber Machinery

MANUFACTURING executives with their many duties sometimes lose sight of the fact that mechanical aids in the form of machinery may have reached the end of their efficiency, profitwise, even though they be constructed seemingly to endure and to go on producing for generations to come.

Rubber company executives, perhaps more than those of most industries, realize at this time, when such revolutionary methods of manufacturing are sweeping through their factory departments, that new lines of manufacturing machinery must be acquired from time to time if their companies are to survive this period of rubber depression and cutthroat competition. One has only to scan *The Official Gazette of the United States Patent Office* published weekly to realize how many new mechanisms are being brought forth by their inventors for absorption into the industry as replacement equipment for antiquated machinery. Furthermore, while new machinery patents should be carefully watched so as to acquire the rights to profitable rubber manufacturing opportunities which might otherwise fall into the hands of a competitor, one must not lose perspective and forget that right within his own plant machinery may be in daily use which is far behind the times both as to quality of its output and the amount of its production.

A glance at the plant inventory sheets of most rubber factories would show a yearly increase in machine investment. Any improved performance to be obtained from these mechanical producers must, therefore, be reflected in constantly decreased manufacturing costs.

Almost every manufacturer finds it profitable to have a development engineer who specializes in the mechanics of production. The duties are naturally varied to suit local requirements, but fundamentally he should study existing mechanical conditions and survey for development possibilities. The logical beginning for such a survey is with the prime power movers such as engines, water wheels, turbines, electric motors, pneumatic devices, etc. The following up of the distribution of this power to the unit manufacturing machines located in various departments will almost without fail uncover a leak in mechanical efficiency which repair, replacement, or redesign can turn into profits.

Machinery is often thought of as having many human characteristics. One of its most parallel traits is that of obsolescence; and just as surely as man reaches an age where lightened tasks or complete retirement is demanded, so can machinery be counted upon to do likewise.

Analyzing the Machinery

Let us suppose that somewhere along the line of the various interconnected machines the development engineer finds one or a group which look suspicious from an efficiency standpoint. Perhaps it may be a machine whose original cost has long since been written off in plant account. How should one go about the problem of determining if that machine is justified in remaining on the plant inventory? A few simple questions whose answers may be weighed to settle this point of analysis might be set forth as follows:

1. Is the work upon which this machine operates to continue in sufficient volume to warrant any change in existing machine conditions?
2. Is the source of its power an efficient means of propulsion? Can a cheaper or less bulky drive be installed to save floor space or cut power costs when the machine is idle?
3. How great is repair and maintenance on the equipment? How much valuable production time is it costing the company because of non-productive shutdowns?
4. Is the quality of work being turned out satisfactory? How costly is production damage due to mechanical inefficiency?
5. If the machine is timed to a fixed cycle by a cam shaft for its operation, can any of its elementary times be shortened so that remodeling is advisable to speed up total operative time and consequently increase production?
6. At what cost can new equipment be developed or acquired to replace the present machine in order to produce more economically?[1]

The above list might be lengthened considerably, but in this brief discussion perhaps enough items have been given to show the thoroughness with which such a survey should be tackled. Item 5, which refers to the operating time of the machine, is in general the most important, and the following hypothetical example will more clearly illustrate its analysis.

Redesigning for Profits

Several years ago when hand making, individual methods of shoe assembling were giving way to more modern methods, a large footwear plant was faced with a serious production problem. This was due in large measure to improved methods which had been inaugurated in one of the contributing departments feeding the work too rapidly for efficient handling in the major assembling room. An operation connected with footwear assembling was being performed at a labor cost of approximately $1.25 per 100 pair of shoes. The machinery in use was bulky and required a man for an operator under great physical fatigue; while quality of output was about 80 per cent acceptable in packing room inspection. The maximum daily output per machine per man was roughly 1,500 pair. The machine was the only type available to the industry for the work required.

Shoe making methods leading up to this machine had been refined in methods and had as a result become increased in speed to the point where the machine described above had actually become the bottle neck of production. Nothing that the executives could do in the way of changing operators or improving the handling to and from the machine could increase its flow of production beyond the 1,500-pair daily mark. Two paths were open for the solution of the problem. First, another machine

[1] Installation of new equipment and removal charges of old must be considered.

similar to the first might be purchased and another operator hired. Second, the machine manufacturer might be consulted to see if it could be redesigned for a faster cycle time[3], with consequent greater production.

The latter course of action was chosen; so the manufacturers assigned an engineer to the job of studying the machine to see if, among other things, time was being wasted during its operation. The cycle time was 10.2 seconds per shoe, but a breakdown of the elementary time showed only 3.0 seconds actually needed to perform the shoemaking operation. The balance of the time, 7.2 seconds, was used up to position the machine parts prior to operating upon the shoe and to remove it after the mechanical shoemaking had been completed.

It was at this point that the engineer found his chance to improve machine efficiency. A study showed that if 4 seconds per cycle could be lopped off the entire machine time and that if this time could be taken from the machine's preparatory and finishing mechanical motions on a daily production of 1,500 pair or 3,000 shoes, it would be possible to save 12,000 seconds, or 3.3 hours of machine production time per day, without disturbing the actual period required for the shoemaking operation. The increased production figured at the new cycle time of 6.2 seconds showed an increased output of approximately 1,900 shoes possible if the change in design were made.

After the machine had been further studied for a way to save these 4 seconds every time it operated, it was found possible to increase the speed or r.p.m. of the drive shaft to give the required faster cycle time. The engineer, however, had to maintain during the machine's operation the original period of time: namely, 3.0 seconds for performing the useful work. Maintaining the original period of time was accomplished by lengthening out the dwelling period of the cams controlling this particular feature of the machine's operation. Chart 1 shows the machine cam chart before remodeling, and Chart 2 the same thing after the increased speed had been obtained. It can be seen that the quality of work on the gum shoe would be equally as good under either condition owing to the fact that the actual working time of 3.0 seconds shown as operation No. 3 on the charts remains the same in both cases.

[3]Cycle time is the total time necessary for the machine to start and complete entirely its operation.

Production Increased

The remodeling of the above equipment was undertaken at a cost of approximately 10 per cent of the machine's replacement value with returns in increased production of nearly 60 per cent, and a single operator was still employed to run it. Such instances of profitable research into existing rubber manufacturing machinery in one's plant cannot, of course, be found everywhere, but all along the line similar situations are at hand. It is very frequently found that valuable productive time is being dissipated in mechanical movements which are preliminary or subsequent to the time actually needed to perform the shoemaking operation.

Rubber machinery fundamentally is no different from that to be found in any other industry; and whether it be an automatic compounder or mixer in the mill room, an outsole cutting machine, or an automobile, we have only to go back a few years in memory, after looking about us, to realize that mechanical improvements have increased machine performance to a remarkable degree.

Comparison of Charts 1 and 2

Operation Number		Old Time Seconds	New Time Seconds
1.	Position machine head	2.	.8
2.	Lock machine head	1.6	.5
3.	Work on shoe	3.	3.
4.	Exhaust machine	.6	.6
5.	Unlock head	1.	.5
6.	Open machine	2.	.8
	Total Cycle	10.2	6.2

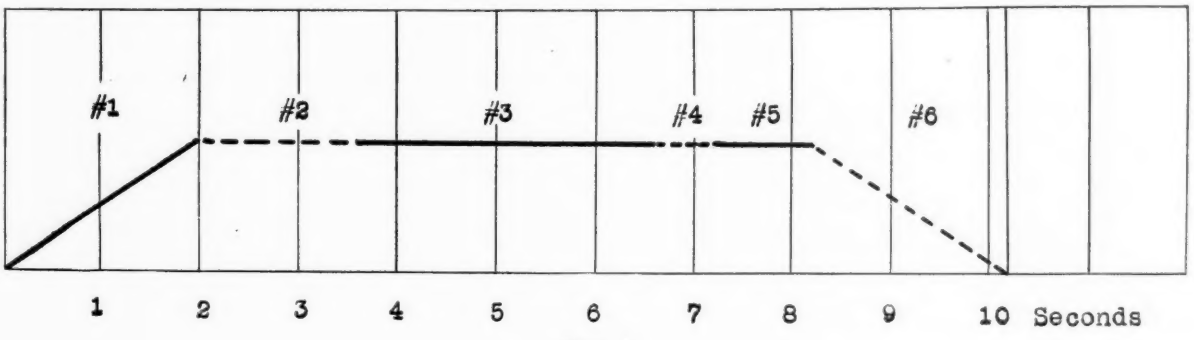


Chart 1

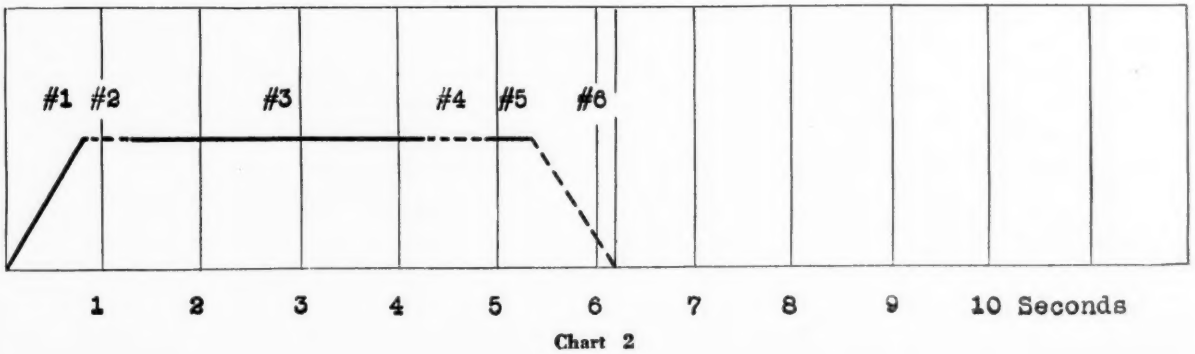


Chart 2

The analysis of existing machine conditions and then the carrying out of a course of action tending to eliminate unnecessary time elements from the machine cycles have brought us to this present high plane of automatic development.

Results obtained from men or machines are always in direct ratio to the degree of understanding that one possesses as to their detail functions; consequently it is a decided asset to have this knowledge. Once it is at the executive's command, he has a powerful weapon to use against needless productive retardment and, in addition, one which will materially reduce his manufacturing costs.

The Lipin of Hevea Latex

THE lipin of Hevea latex is a peculiar fatty constituent of that material. It has been investigated within the past year and its properties determined.[1]

The yield of lipin from latex is approximately 0.2 per cent. When a small quantity of the solid is treated with a drop or two of water and left for some hours, the material assumes the form of a jelly. If the early stages are observed under the microscope, small round globules can be seen detaching themselves from the main mass floating away into the water. The substance has a pronounced effect on surface tension. It can be flocculated from a water emulsion by the addition of acids.

It has no definite melting point. When heated to 60° C., it softens slightly but does not melt. When heated over a free flame, it melts and chars at the same time, giving off a smell like hot lard and, finally, cokes badly, smelling like burnt sugar.

The iodine number of the original material is 97. If an aqueous suspension be made, flocculated with acid, and the precipitated material extracted with ether, it is found that approximately 95 per cent of the original weight of the material has been recovered. The loss in weight is due in the main to the loss of inorganic constituents. The iodine value of the ether-extracted material is now found to be 102, and the increase from 97 corresponds to the loss of 5 per cent of materials having no iodine value.

F. H. Cotton states that lipin from latex has an extraordinary power to prevent self-adhesion of masticated rubber.[2] Having sprayed freshly calendered hot pure gum stock with a minute quantity of 2 per cent lipin-in-ether mist, he proved that the treated sheet will not stick when folded, even when left in contact for a long time.

Continuing Professor Cotton says: "While not suggesting that Hevea lipin could be used commercially for such a purpose, it does seem possible that other available substances of similar constitution and properties—such as egg lecithin—may find application in replacing dusting powders and cloth liners. The advantages of replacing such powders as talc and zinc stearate with a trace of lecithin, which is quite dustless, can be imagined. Preliminary tests suggest that wiping the surface with a rag moistened with solvent renews the adhesive character; and, furthermore, the lipin seems to disperse during cure so that ply-separation is unlikely in articles built up from such treated calendered sheet. The lecithin might be sprayed or brushed on as a dilute water-emulsion; or it might be introduced by running the calendered sheet or frictioned material over a treated roller, after which the sheet could be rolled up without a liner."

[1] E. Rhodes and R. O. Bishop in *Quarterly J. Rubber Research Inst. Malaya*, Vol. 2, No. 3, pp. 124-35, Nov., 1930. Also *Chem. & Tech.*, July, 1931, pp. 330-38.

[2] *Rubber Age*, London, Dec., 1931, pp. 341-42.

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Certifying Rubber Goods

Manufacturers Who Are Enterprising in Many Other Sales Activities Said to Be Missing a Big Opportunity—Concerns That Find Advertising Specification Guarantees Profitable

FIFTEEN makers of rubber mats seemingly represent the billion-and-a-quarter rubber industry in a list of over 5,000 "willing-to-certify" firms that have expressed their desire to supply material on contracts based on 356 selected federal specifications and approved commercial standards, and their readiness to certify to purchasers, on request, that such material is guaranteed to comply with the requirements and the tests of those specifications and standards. This news is imparted in an October 29, 1931, statement of the Bureau of Standards, United States Department of Commerce.

The Bureau, which has done such notable work for American industry generally, is now much concerned with a self-identifying quality-guaranteeing plan being developed by numerous organizations for bringing to the attention of small quantity "over-the-counter" buyers certain well-established kinds of staple commodities manufactured to comply with nationally recognized specifications, and which is regarded as an important step in expanding the mass-production, mass-distribution, mass-consumption idea.

Present Rubber Standards

The reference to the 15 rubber mat makers does not imply that for various important rubber products manufacturers do not conform to various high standards, but rather that there is much need of and evidently much advantage for rubber manufacturers in cooperating in the new movement and in having an extensive range of products on which certification labels would be warranted. Fire hose makers not only comply with the requirements of the National Board of Underwriters, but in several instances they make a hose superior to such requirements. Rubber-insulated wire makers pride themselves on conforming not only to the National Electrical Code but also to the exacting conditions imposed by the fire insurance companies' Underwriters' Laboratories, Inc., which, when goods meet required tests, authorize the use of the latter concern's label. Many rubber manufacturers, producing goods for the United States Navy, commonly exceed the latter's rigid specifications.

Many other exacting conditions on the part of consumers are met by rubber manufacturers, and without specified requirement they not only adequately meet general buyer needs but usually exceed them. In fact a considerable number of manufacturers have such an excellent reputation for giving quality and service in their products that buyers, exacting enough about other supplies, order their rubber goods with entire confidence that they will get exactly what they require.

Getting a Broader Market

The manufacturer who depends largely upon building up a demand for his goods through the recommendation of buyers who have made satisfactory try-outs may indeed be building on a very substantial foundation, but there are other sales methods just as conservative and certainly much speedier and more profitable. In fact the maker of superior products owes it not only to himself but to the community, experts contend, to cease his shy tactics and to adopt a more aggressive policy in marketing. The public generally as well as a limited number of customers wants to know where it can get the most dependable goods.

It is even stated that the rubber industry has suffered a considerable loss because it has not generally taken to the certification plan. While other instances might be cited, that of the hot water bottle may suffice for an illustration. All kinds of rubber hot water bottles have been made for years; some of most irreproachable quality, some of fair grade, and too many in the stress of competition of an admittedly low grade. Unfortunately the impression made by the cheap quality goods has to a large degree adversely affected sales of the best quality articles. The faith of buyers having been shaken, the assurance of makers of the better grades could not offset the damage done to the worthier goods. How were buyers to know that even if they paid more for better hot water bottles, the latter would not crack, come apart, and leak perhaps not so soon but as certainly as the cheap bottles? Here was the opportunity for the manufacturers of aluminum hot water bottles, and they have been making the most of their chance.

Giving Impartial Approval

Since buyers are too often incredulous of the direct assurance of manufacturers, a very effective means has been devised of setting their doubts at rest and incidentally, of speeding up sales. Certain magazines of high repute and wide circulation, for instance, maintain laboratories at which are tested all sorts of products. If the latter conform to the high standards set, their makers are authorized to label such goods as fully approved by an exacting and impartial authority, and that such certificate of quality makes a remarkably strong trade appeal is only too well known to large and small dealers. The concededly competent and unbiased opinion is sought by those unable to determine for themselves the merits of goods; and the quality labels allowed are much prized as business bringers by the manufacturers who secure them.

Among the many concerns that have been educating buyers to look for a quality label on manufactures is the American Gas Association. Not long ago the market was fairly flooded with nondescript gas ranges and other appliances, many of which were unsafe and inefficient. The gas association, interested primarily in the more extensive use of the vapor fuel and not in any particular devices for burning gas, saw the need of encouraging the production of better ranges and other appliances if gas were to hold its own against electricity. It, therefore, established testing laboratories in several sections of the United States and began to issue permits to use the "A. G. A." seal to all manufacturers whose appliances met with the association's exacting requirements; and buyers have learned to know the significance of such a guarantee. In a similar way national standards have been set up for certified milk, corn

meal, medicines, implement handles, fire extinguishers, knit underwear, thermometers, animal feeds, mattresses, canned goods, brick, hardwood flooring, metal piping, steel bars, wall and tissue paper, and numerous other miscellaneous products.

Benefits Maker and Buyer

It is pointed out that the use of labels would save large-contract buyers much of the time and the cost of routine acceptance testing; and that firms manufacturing commodities complying with nationally recognized specifications would find such assurance very effective sales talk.

Progressive manufacturers would take advantage of the publicity given in the formulation and promulgation of nationally recognized specifications by advertising that their products comply with those specifications.

The maximum benefit to all persons concerned will, it is held, be obtained when the "nationally recognized specification" for a chosen commodity has been so formulated as to cover the most satisfactory commodity in the best possible manner, when the manufacturers place this commodity in "mass production" in accordance with this specification, and when the suppliers issue their certificates guaranteeing compliance with this specification, and "guarantee labeling" establishments base their tests and inspections on this identical specification.

Dealers' Stocks of Tennis Shoes in the United States[1]

November 1, 1931

THE Rubber Division of the Department of Commerce recently completed a survey of dealers' stocks of tennis shoes in the United States, as of November 1, 1931. Reports from 18,289 dealers, covering the entire country, show total stocks of canvas rubber-soled shoes as of November 1, 1931, as 2,586,381, an average of 141.4 prs. per dealer, which is a reduction of 6.2 prs. per dealer from the average of 147.6 on November 1, 1930.

Dealers were asked to report their stocks of tennis shoes under various price ranges, which will be used in the statistical tables of this report. A comparison is made in the 2 following tables between the stocks of tennis shoes reported by dealers in the present survey and that for November 1, 1930. It will be noted that the total number of dealers reporting each separate item is shown as well as the total number of individual reports. In the fourth column "Percentage of Total Dealers," the percentages are arrived at by using the total number of individual dealers reporting and not the addition of the column, and for this reason the percentages do not add to 100.0 per cent.

TOTAL AVERAGE STOCKS, SHOWING AVERAGE NUMBER OF PAIRS PER DEALER

Cost Price Per Pr. to Dealer	November 1, 1931 No. of Dealers Reporting	No. of Prs.	Average Per Dealer Prs.	Percentage of Total Dealers	Percentage of Total Stocks
Up to 75c	15,012	1,248,414	83.2	82.1	48.3
76c to $1	13,915	599,344	43.1	76.1	23.2
$1.01 to $1.50	11,449	396,369	34.6	62.6	15.3
Above $1.50	7,209	219,651	30.5	39.4	8.5
Specialty oxfords and pumps	3,118	122,603	39.3	17.0	4.7
Total	18,289	2,586,381	141.4	100.0	100.0

Cost Price Per Pr. to Dealer	November 1, 1930 No. of Dealers Reporting	No. of Prs.	Average Per Dealer Prs.	Percentage of Total Dealers	Percentage of Total Stocks
Up to 75c	13,612	1,037,754	76.2	74.8	38.7
76c to $1	14,533	687,277	47.3	79.9	25.6
$1.01 to $1.50	12,638	524,726	41.5	69.4	19.5
Above $1.50	8,519	301,823	35.4	46.8	11.2
Specialty oxfords and pumps	2,912	134,309	46.1	16.0	5.0
Total	18,200	2,685,889	147.6	100.0	100.0

The following table has been prepared to indicate the growing importance of low price tennis shoes in the average dealer's stock in 1931, compared with 1930. For instance, the average dealer on November 1, 1931, in the United States had stocks of 141 tennis shoes and the percentage of total stocks in the price range "Up to 75c." was 48.3 which works out to 68 pairs. The tendency of the average dealer to have more stocks of low priced shoes than formerly is believed to be more the result of reduced prices than of any reduction in quality of product.

[1]Department of Commerce, Bureau of Foreign and Domestic Commerce, Washington, D. C., Special Circular No. 3,145, Rubber Division.

STOCK OF AVERAGE DEALER

Cost Price Per Pr. to Dealer	Average No. of Prs. on November 1 1930	1931
Up to 75c	57	68
76c to $1	38	33
$1.01 to $1.50	29	21
Above $1.50	16	12
Specialty oxfords and pumps	7	7
Total average dealer stock	147	141

Dealers with Over 500 Prs. in Stock

A separate tabulation was made of those reports in which total stocks amounted to more than 500 prs. each. In the present survey there were 472 dealers in this group having total stocks of 834,529 prs. of tennis shoes or an average of 1,768 prs. per dealer, compared with 539 dealers having 971,890 prs. or an average of 1,803 prs. per dealer on November 1, 1930.

R.M.A. Anticipates Swope Plan

PRESIDENT GERARD SWOPE, of the General Electric Co., in expounding further his plan for the mitigation of industrial depressions, regards as very essential the regular collection of reports on the output of major products in each industry and the inventories carried by manufacturers and distributers. With the purpose of eliminating waste effort and better stabilizing business, the Rubber Manufacturers' Association, Inc., has for several years through its questionnaires been regularly collecting just such information. That its ample official statistics have spared producers much hazardous guesswork and put trade on a saner, safer basis is freely conceded.

Defending the spreading by trade associations of knowledge regarding business ethics and practices, Mr. Swope cites an opinion of the United States Supreme Court that "the natural effect of the acquisition of wider and more scientific knowledge of business" could hardly be deemed a restraint of commerce, "or in any respect unlawful." Trade associations should, he maintains, endeavor to prevent overproduction and should regard as an unfair competitor any member who, knowing the limit of the public's consuming power and the stocks possessed by members, nevertheless builds up a large inventory which later must be sold regardless of cost, with demoralizing results.

Business will be greatly stimulated, he believes, by adopting the suggestion of the American Bar Association for the abatement of the criminal aspects of the Sherman anti-trust law and is modification to permit of reasonable trade agreements.

Is Manufacture Direct from Latex Worth While?[1]

S. D. Sutton, F.C.S., A.I.R.I., (Tech.)

IN THE previous article a few of the estate problems and the transport difficulties of latex were dealt with, and it was shown that the utmost care must be taken if the latex is to reach the manufacturer in good condition.

On arrival at the factory careful examination of a shipment of latex is essential. If purchased on the market, the latex is sold by rubber content; but, as the methods for determining the dry weight of rubber per gallon differ, a check is necessary. No standard method of test is in use at present, and there can be no doubt that the time has come when a standard test should be adopted by estate, broker, and manufacturer.

The usual method in use on the estates is the metrolac, an instrument of the hydrometer type which is fitted with a scale enabling the approximate rubber content to be read direct. Usually a sample is taken from a bulking for test, or perhaps 2 or 3 samples are taken as, although bulked and stirred, the varying rubber contents of the latices do not disperse very well. It is, therefore, not possible to obtain an accurate result by this method, and, when the containers are filled, there is certain to be a variation in each tin or drum given by the estate or the broker. This difficulty manifests itself mainly at port of destination, for, when sampled at the docks, it is not possible to open every tin or drum, and the consignment is sold on the result of the dock sample. When the latex reaches the factory, the rubber content is again determined on samples taken from a bulking and often does not agree with the figure given by the estate or the broker. This condition has led to many disputes between the manufacturer and the estate as the difference is sometimes as much as 2 per cent.

Various methods for determining dry rubber content have been suggested, many of which make use of precipitation by means of acid. Stevens has described a method which might well be used as a standard both on the estate and in the factory. A portion of the sample, 10 to 50 cc. is weighed out into a dish and dilute acetic acid, ½ to 1 per cent is stirred in. The basin is then placed on a steam bath for about half an hour. The rubber is precipitated and forms a clot. If a coherent clot with a clear serum is not obtained, the test sample must be rejected and the operation repeated, using slightly stronger acid. The serum is removed and replaced with clean water to wash off most of the acid. The clot is then taken to the washing rollers and creped out thinly under a good stream of water. Drying is carried out in a steam oven if a rapid result is desired, but a much lower temperature, 50° to 70° C., is to be preferred. The dried rubber is then weighed until constant.

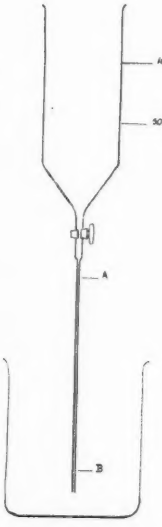


Fig. 1. Latex Viscosimeter

Another method which is largely practiced involves the use of stronger acid but is useful where steam and washing rolls are not available. From the sample 25 cc. of latex are measured and poured into a petric dish. A similar quantity of diluted 10 per cent sulphuric acid is poured into the measure and transferred with any rubber adhering to the side of the dish. Coagulation sets in at once, and the clear serum is poured off. The coagulum is washed in running water for 5 or 6 hours to remove all traces of the acid and serum substances. It is then pressed between butter muslin to remove most of the surplus water and is dried as above.

This method gives slightly higher results than that of Stevens and takes longer to complete. Either method is satisfactory provided it is made standard practice both on the estate and in the factory. For the determination of concentrated latex the former method is essential as a volumet-

[1]Continued from INDIA RUBBER WORLD, Nov. 1, 1931, pp. 59-60.

Fig. 2. A Typical Rubber Estate Factory in the Far East

ric determination is not considered sufficiently accurate.

Examination for ammonia content is often essential and is best carried out by titration, using an external indicator. An alternative method is to boil off the ammonia from the latex into a standard acid solution, the result being obtained by titration in the usual manner.

The above tests are in use for most practical purposes in the factory, and in view of the present tapping methods on certain estates it may be as well to determine the amount of serum and resin present. The low market price of rubber has led many estates to tap the trees in certain areas giving the highest yield, and it will be generally found that the higher the rubber content of the latex, excluding concentrated latex, the richer it is in serum substances.

A rapid method of serum determination is to evaporate 25 cc. of latex and find the total solids. A similar amount is coagulated and the rubber content found by the methods already described. The serum content is found by difference. The amount of resin is determined by the usual acetone extraction method on the dry rubber sample.

Latex having a rubber content of 38 to 42 per cent is particularly likely to have a high serum content; and, while this condition is an advantage from many practical points such as a saving in freight, less evaporation during manufacture, and better aging qualities, there is a tendency for quicker putrification setting in and, in many instances, lower tensile strength of the dry rubber.

Viscosity, too, has an important role in latex manufacturing processes and varies greatly with every shipment. Unlike ordinary rubber solution, the rubber content of latex plays only a small part as regards viscosity, it being possible to obtain a latex of 33 per cent d.r.c. having a much higher viscosity than a 40 per cent d.r.c. This possibility applies also to latex concentrated by centrifuging.

Determinations of viscosity can be made in the standard viscosimeter used for rubber solution, but this is likely to become clogged by small pieces of coagulated rubber. The type shown in Figure 1 gives good practical results and is easily cleaned. It consists of a dropping funnel graduated to 50 and 100 cc. to which a capillary tube is joined. 50 or 100 cc. of the sample are strained and allowed to pass through the viscosimeter; the rate of flow is noted by a stop watch. The readings are taken as the latex passes the points A and B on the capillary tube. This action is repeated 3 times, and the mean result taken. When latex is artificially thickened, this method is extremely useful.

The vulcanization of latex by the Vultex process discovered by Dr. Schidrowitz necessitates similar tests to those already described but, in addition, a vulcanization test is given on a small quantity and a film evaporated at a standard low temperature. Test pieces are cut and tested on a Schopper or Scott machine. Some typical results carried out on a Schopper machine with ring test pieces are given below.

Estate	Per Cent	E. 600	E. 1040	Type	Break	Elong. at Break
A d.r.c.	33	614	720	42.4	3,053	9.70
A d.r.c.	33.3	628	735	42.8	3.120	9.84
B d.r.c.	40.5	690	796	42.4	2,348	10.06
B d.r.c.	38	684	803	47.6	2,537	10.04

It will be noted that the figures for Estate B are much lower than those of A; also the rubber content of B is higher. In actual practice B Estate gave more trouble in the works, although the conditions of vulcanization for all 4 batches were similar and the vulcanizing ingredients adjusted to the rubber content.

On completion of the necessary tests the latex is passed to the factory for the manufacturing processes which will be dealt with in a later article.

(*To be continued.*)

Water Lubricated Soft Rubber Bearings

W. F. Busse and W. H. Denton[1]

BEARINGS of soft vulcanized rubber have been used for many years in marine service under conditions necessitating the use of water as the lubricant, where sand and grit are often present. The toughness, the resiliency, and the low coefficient of running friction of rubber make it a superior material for this service, and it has been found to outwear harder materials such as metals and lignum vitae by as much as 10 times their service life.

The softness and the resilience of rubber which permit it to be deformed enough to allow sand grains to travel through the bearing without scoring it or the shaft, also have an important effect upon the performance of the bearings when lubricated with water free from grit. The resilient rubber can accommodate itself to slight irregularities present in a shaft, and hence a thinner film of lubricant will serve than would be required by a hard bearing.

A fundamental study of the friction of different types of soft-rubber and of metal bearings under various conditions has shown that the classical laws of bearing lubrication worked out by Towers, Reynolds, etc., for cylindrical metal bearings do not apply to the commercial type of fluted rubber bearings. Because of the difference in the fundamental laws underlying their performance, rubber bearings are superior to metal bearings under many conditions of industrial as well as marine service. There seems to be no upper limit to the speeds at which water-lubricated rubber bearings can be used if sufficient lubrication is provided. Rubber bearings have yielded good service at shaft speeds of 12,000 r.p.m. or 4,330 ft. per min. The upper limit of loads these bearings can carry depends very much on the operating conditions, but bearings have been run when loaded as high as 850 lb. per sq. in.

Water-lubricated rubber bearings have already been used in deep-well pumps, turbines, and many other places where water must be used as a lubricant, as well as in propeller shaft bearings in various classes of ships, and they have given economical and satisfactory service. In sand washers and other places where conditions are equally severe they have yielded service many times that of metal bearings. Under proper conditions the coefficient of friction of soft rubber bearings compares favorably with that of the best roller bearings.

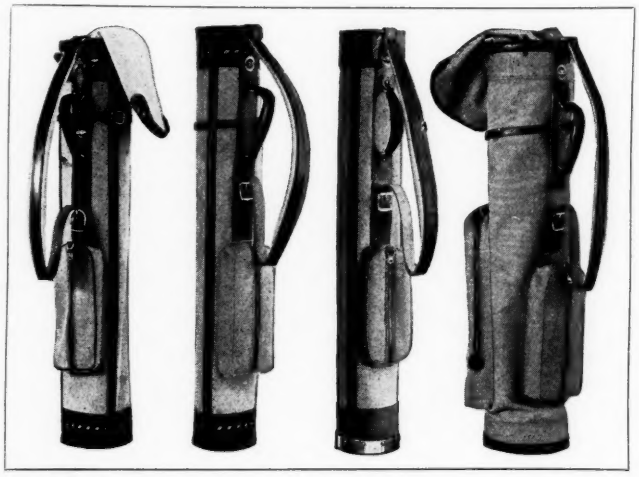
Rubber bearings will carry loads of 600-800 lbs. per sq. in., provided the shaft is very smooth and that the load is applied only after the shaft gets up to a peripheral speed of about 500 ft. per min. It is also necessary that sufficient cooling water flow through the bearing to keep the temperature of the lubricating film below the boiling point. Still higher loads can be carried if the water is forced into the lubricating film under pressure, or if the shaft revolves at higher speeds.

Soft-rubber bearings are suitable for high-speed shafts because they withstand high loads at these speeds and because the bearing acts as a cushion to reduce vibration and decrease the dynamic loads set up by the revolving shaft.

[1] Senior and junior physicists respectively of The B. F. Goodrich Co., Akron O. Abstracts from a paper read at the annual meeting of The American Society of Mechanical Engineers, held at New York, N. Y., Nov. 30 to Dec. 4, 1931.

Rubber Reenforces Golf Bags

Manufacturers Using Resilient Material on Containers Not Only Add Much to Comfort of Users, but Also Prolong Life and Looks of Bags and Clubs



Atlantic Products Corp.

Rubber Reenforced Golf Bags

GOLF bag manufacturers have long provided well-rubberized fabrics in their products to exclude moisture, but in the recent past they have done much more toward adding to the peace of mind of golfers through unique applications of rubber in the construction of bags. One of the common worries of players, for instance, has been the habit of caddies to drag bags not only on the soft fairways but on rough earth as well, thus making the leather bottoms of the bags soon look unsightly through the scuffing and often making early replacement necessary.

Molded Rubber Bottoms

Now the makers provide for golf bags a black or a brown molded rubber bottom that defies the carelessness of caddies. Much of the rubber stock thus used resembles that employed in rubber heels and tire treads, and it can stand an incredible amount of abrasion. Even two years of hard daily wear do not seem to lessen the looks or the usefulness of these rubber fittings. An advantage, too, of the rubber bottom, as well as the molded rubber top which now comes as standard equipment, is that the contents are not marred when thrown into the bag.

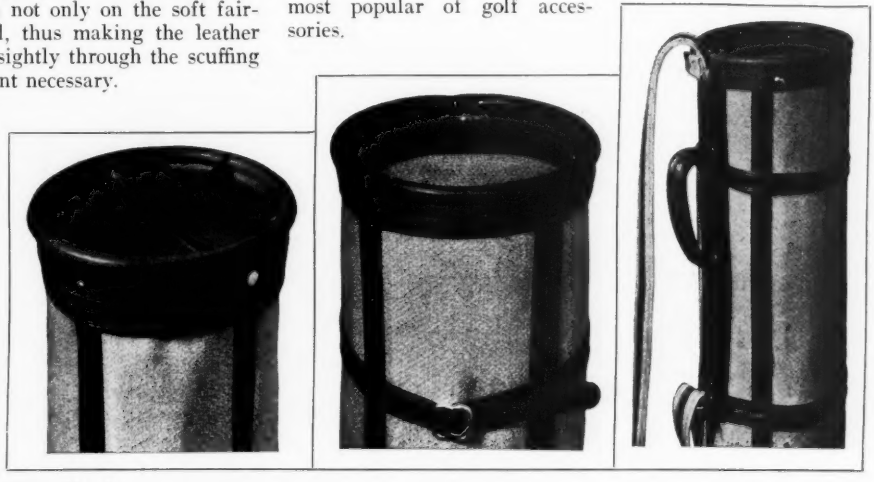
The rubber cushioning offsets rough handling and effectively saves club handles and wrappings from being scraped or otherwise damaged. Insurance of extra long wear is given to lightweight stayless bags by fitting them with two or three rubber bumpers under the fabric.

Rubber Grips and Straps

Even the carrying of golf bags is made easier by using rubber handles that are reenforced with spring steel. They are not only strong but pliable and easy to grasp and are so designed that, when properly positioned, they insure perfectly balanced carrying. A new comfort feature which replaces the common leather strap for the shoulder is a wider, well-padded strap in the center of which a novel application of rubber tubing prevents shoulder slipping.

Instead of leather strip reenforcements, bands or stay band coverings of a tough rubber compound are now used a great deal and add much to the style and the durability of golf bags.

Another golfing essential, a carry-all bag, of English duck or real or imitation leather, with leather handles and a zipper closing device, now is available with a rubber bottom. The rubber is of a similarly tough composition as that used for the tops and the bottoms of golf bags and is put just where the wear is felt most. It has proved one of the most popular of golf accessories.



Hinson Mfg. Co.

Molded Rubber Bottom **Molded Rubber Top** **Molded Rubber Handle**

Standard Specifications

for

Rubber Matting for Use Around Electrical Apparatus or Circuits Not Exceeding 3,000 Volts to Ground[1]

A.S.T.M. Designation: D 178-24[2]

SPECIFICATIONS

1. THESE specifications cover rubber matting for use as a floor covering near electrical apparatus.

Manufacture

2. The matting shall consist of a rubber compound corrugated on one surface and backed with cotton fabric, or having one or more cotton fabric inserts, the back of the matting being finished with cloth imprint.

Physical Properties and Tests[3]

(A) Mechanical

3. All the tests necessary to determine the mechanical properties specified in the following sections shall be made on the rubber exclusive of fabric and shall be made in accordance with Sections 48 to 56, inclusive, of the Standard Methods of Testing Rubber Products (A.S.T.M. Designation: D 15) of the American Society for Testing Materials.[3]

4. Not less than one sample shall be taken from each piece or roll of matting and subjected to the following tests.

5. (*a*) The tensile strength shall be not less than 700 lbs. per sq. in.

(*b*) The elongation at the breaking load shall be such that the original 2-in. gage length of the test specimens shall stretch to not less than 7 in.

(*c*) The set, following a stretch from 2 to 5 in., shall not exceed 25 per cent.

(B) Electrical

6. All the tests necessary to determine the electrical properties specified in the following sections shall be made in accordance with the methods described in Sections 13 to 17, inclusive.

7. (*a*) The entire area of the matting as nearly as practicable shall be tested between electrodes consisting of rectangular metal sheets, having smoothly rounded edges and corners and of any convenient length, the width being such that arcing around the edges of the matting will not occur, the tests being made progressively until the entire length of the matting has been covered.

(*b*) A potential of 15,000 volts shall be applied for one minute at each position of the electrodes. The matting shall not puncture, become appreciably warm at any spot, or show any other sign of weakness.

8. A specimen cut from the sample and tested to failure in air between 2-in. disk electrodes with edges rounded to a radius of ¼-in., the voltage being applied at the rate specified in Section 14, shall not fail at less than 40,000 volts.

Dimensions

9. The thickness, unless otherwise specified shall be not less than ¼-in. when measured over the corrugations and not less than ⅛-in. at the root of the corrugations.

Workmanship and Finish

10. Matting shall be free from patches, blisters, pinholes, cracks, protuberances, embedded foreign matter, or other physical defects which can be detected by thorough surface inspection.

Inspection and Rejection

11. The matting shall be inspected and tested within 4 weeks of the date of delivery.

12. (*a*) Any piece or roll of matting which fails to pass any of the requirements of these specifications shall be rejected.

(*b*) In case of failure to pass any one of the tests specified in Sections 5 and 8, the piece or roll of matting represented by the sample subjected to these tests shall be rejected.

METHODS OF TESTING

13. The testing voltage shall be obtained from a testing equipment, no part of which has a capacity of less than ½-kva. per sq. ft. of electrode surface. In no case shall the rating of any part of the testing apparatus be less than 5 kva. The frequency of the testing voltage shall be not more than 65 cycles.

14. The potential shall be applied at a low value and gradually and steadily raised at a rate of approximately 800 to 1,000 volts per second until the prescribed testing voltage is reached.

15. The test period shall be counted from the instant when the prescribed testing voltage is reached.

16. The method of regulating the testing voltage shall be one which does not distort the wave form of the testing voltage from a sine wave. Acceptable methods include:

(*a*) Field regulation of the alternator supplying the transformer;

(*b*) Induction-type regulator;

(*c*) Variable-ratio-transformer type of regulator;

(*d*) Potentiometer type of rheostatic control where the current in the portion of the potentiometer resistance in parallel with the primary of the transformer is at least 5 times the exciting current of the transformer.

17. The testing voltage shall be measured by one of the following methods:

(*a*) A properly calibrated electrostatic voltmeter connected directly across the matting under test.

(*b*) Any properly calibrated commercial type of alternating current voltmeter connected to the low tension side of the transformer in conjunction with the ratio of transformation of the transformer provided that the ratio is definitely known for all test conditions.

(*c*) A calibrated potential transformer with a voltmeter.

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[1] Under the standardization procedure of the American Society for Testing Materials, these specifications are under the jurisdiction of the A.S.T.M. Committee D-11 on Rubber Products.

[2] These specifications are issued under the fixed designation D 178; the final number indicates the year of original adoption as standard or, in the case of revision, the year of last revision. Issued as tentative, 1923; adopted, 1924.

[3] 1930 Book of A.S.T.M. Standards, Part II, p. 1053.

Watertight Caps and Shoes

A Tapered Band of Air Pockets Inside Bathing Cap or Shoe Tends to Exclude Water and Other Undesirable Matter

"GIVE me a cap that really *is* waterproof."

Such is the cry of the woman swimmer, especially one who has an exquisite coiffure to cherish (and who hasn't in these days of inexpensive but satisfactory permanent waves?)

Many of her male companions who would avoid the risk of wet hair share her plea. More important still is the insistent demand of the swimmer who also has had the painful experience of getting his ears full of water.

Bare feet, too, are subject to many dangers. Yet ordinary bathing shoes offer inadequate security; consequently they receive the same criticism as the simple rubber cap. No one in swimming wants to lose a slipper; but what are you to do when the force of the water working its way into the shoe is sufficient to pull it off your foot? The sensation, furthermore, is far from pleasant of having mud or slime seep into loose fitting shoes while you are walking around the beach. Then what about the sand and the tiny pebbles that manage to get inside such footwear? All these inconveniences increase the demand for watertight caps and shoes.

Several attempts have been made to fill this need. Details of one of these efforts are embodied in 3 patents.[1]

This invention calls for a tapered band of air channels, as shown in the illustration, around the inside edge of a bathing cap molded to conform to the shape of a human head. These air pockets, formed by ribs projecting inwardly from the cap, contact with the head of the wearer. The hollows between the ribs make the seal between headgear and flesh stronger because the suction effect of these spaces causes them to act as vacuum cups.

The tapering principle is an innovation to increase this suction action. It has been found that when a wave strikes a cap having a thin flat edge, it is inclined to flatten out and press the edge against the skin; but when a wave strikes a blunt edge, the tendency is to lift the edge away from the head. The inventor, therefore, designed the band of air pockets to taper gradually from almost no thickness at the extreme edge to a heavier band farther up the cap. This construction aided by the impact of the wave makes the cap cling even closer to the skin of the swimmer.

The hollows of the water barrier inside the cap may assume any design such as diamond, square, oval, triangle, etc. While, however, any shaped cup will serve to keep the edges of the cap firmly gripped to the skin, the sundry forms react differently under tension. This tendency is overcome by varying the cross-sectional shape of the band.

The ribs forming the watertight seal should have sufficient rigidity so that, when stretched, they will not upset and destroy the vacuum cups. The rigidity of the ribs depends on the material of which they are formed, their width, and the depth of the cups. The ribs are more effective as sealing surfaces if they are narrow, but their width need not be uniform. The number of rows also may vary, for even a single row does efficient work. The ribs, although they embed lightly on the skin, are said not to bind the head or cause the wearer discomfort.

The elasticity of the material forming the cap likewise is taken advantage of to press the ribs closer to the skin. Depending on the choice of the wearer, a chin strap may or may not be featured. The cap, though, does not really need the additional security of a strap to keep it on.

It is essential in putting on these caps that all hair be smoothed together to leave the skin exposed, especially about the nape of the neck, so that the cap fits all around its edges in immediate contact with flesh to which the suction cups adhere.

The same device is applied to the inner edge of the bathing shoe, as also revealed in the illustration. This construction renders the grip of the shoe more secure. It serves also to exclude unwanted substances from the slipper. In one instance where two rows of cups are used, they are separated by a channel or groove which acts as a trap if, perchance, any undesirable should penetrate beyond the first row of ribs.

The elasticity of the material of which the top of the shoe is fashioned will press the band of air channels close to the skin. If desired, however, the effect may be increased by placing a reenforcing band of elastic material along the outside edge of the shoe. A strap across the instep also strengthens the grip of the foot covering.

As with that section of the bathing cap which immediately presses against the wearer's forehead, so with that portion of the shoe which fits exactly across the instep, where there is close contact with the skin of the wearer, the rows of air pockets may be broken and no band placed on that part of cap or shoe.

On both headwear and footwear the band of crossed ribs may consist of a separate strip attached to the edge of each article in some convenient manner. A more satisfactory arrangement, however, is to have the crossed ribs an integral part of the cap or the shoe.

These caps and shoes undoubtedly will be featured at the forthcoming bathing accessories displays to the trade for the 1932 season.

[1] U. S. Patents Nos. 1,746,427, 1,746,477, and 1,746,478, all issued Feb. 11, 1930.

Control of Raw Stocks in a Rubber Factory

MORE money can be made, or alternatively lost, in the purchase of raw materials than is sometimes possible in the actual business itself, and many a firm has regretted forward purchases which have resulted in considerable and often ruinous loss. Particularly has this been the case in recent years with forward purchases of rubber and cotton. The anticipation of market fluctuations entails really accurate, reliable knowledge if the forward purchase of material, possibly representing many months' requirements, is to be lifted from the level of a common speculative gamble, which no firm should entertain with shareholders' money. Today many firms, if not actually facing ruin, will be crippled for many years as a result of too heavy speculation in rubber prior to its final disastrous slump.

There is, however, a more important aspect of stock control which is to some extent independent of markets and presents its problems equally in a steady as in a fluctuating market. For any material used in a rubber factory there is normally a minimum stock which it is inadvisable to get below, but which it is essential to approach as nearly as possible under all ordinary circumstances.

The maximum cannot be fixed since this will depend to some extent upon reasonable, calculated anticipation of the market when conditions are other than normal. Such conditions, however, will form the exception and not the rule, and in most cases a carefully fixed minimum stock will provide sufficient guide, stocks being kept as close to this as working conditions allow. For example, taking into consideration all relevant factors, a minimum stock of zinc oxide may be fixed for a particular factory at 2 weeks' supply. Careful stock keeping will probably allow actual stock to fluctuate between this figure and 3 weeks' supply.

A carefully calculated minimum stock list should, therefore, be established in the factory, and many factors must be taken into consideration. The actual weight of stock carried for each particular item will obviously depend on the regular demand and also on the cost of carriage. In the case of whiting the cost of transport may be so high in relation to the material cost that a higher stock figure would be allowable than in the case of a more expensive material. In such instances the possible variation between actual and minimum stock figures would be relatively high. The source of the material is of importance since this may entail a long journey with no local stock to draw upon, and a rejection in such cases might entail a long wait for further supplies. The material may also be less readily obtainable at some seasons of the year than at others.

Some compounds are much more liable to rejection by the control departments, with consequent delay, than others, and this fact must also be taken into account, together with the time required for testing, but with due consideration a valuable guide can be drawn up for stock keeping. It is important to bear in mind, however, that such a list can only be a guide and must be frequently revised to follow fluctuations in the use of compounds through the addition of new items of manufacture, elimination of others, increased or decreased production, seasonal goods.

Mass production of any article, such as tires or footwear, simplifies the problem to a large extent since materials are handled in bulk, and comparatively regular flow can be maintained; but the difficulties of adequate stock control increase enormously in a general rubber factory making a wide range of products and handling regularly several hundred mixings. In many of the general rubber goods factories many articles are made spasmodically in varying quantities likely to cause a heavy increase or decrease in the amount of a compound required during any week. It is essential in such cases to follow the output daily so that the general trend can be anticipated; and if planning of the production for the following day is possible, a valuable aid to control is provided. Absolute failure to make deliveries should thus become comparatively rare although it is impossible where conditions vary widely to anticipate all requirements.

The stock control department should be notified of any important change in a mixing or specification before it comes into operation, and so far as possible no radical change should be introduced until old stocks of material have been used up. Sudden demands or cuts due to sales orders must also be passed forward without delay, and the control department should know the periods during which all seasonal goods are manufactured so that anticipation of demand can be made. Failure through these causes can thus be largely eliminated.

Compounds in universal call, such as zinc oxide, are not largely affected by a drop in demand on one particular line of article, except that it is important to realize the amount of capital locked up for an additional unnecessary period. Dyestuffs and similar materials, however, which may be used in one or 2 mixings only, may be seriously affected by the cancellation of one of these, resulting possibly in a visible supply of 3 weeks becoming one of many months with no possibility of other outlet. It is advisable in all such cases to keep stocks extremely low, even to the danger point, in order to prevent the accumulation of expensive idle stocks.

Rubber Association Meeting and Dinner

THE seventeenth annual meeting of The Rubber Manufacturers' Association, Inc., will be in the Assembly Rooms of the Waldorf-Astoria Hotel, 50th St. and Park Ave., New York, N. Y., begininng at 10.30 a. m., Monday, January 11, 1932.

The regular order of business will begin at 10:30 a. m. A luncheon is to be served at 12:30 p. m. to all in attendance. Following luncheon, opportunity will be given for discussion of any subjects in which members may be interested. It is the earnest wish of the officers and directors that all firm representatives be on hand promptly at 10:30 a. m., and that everyone stay for lunch and participate in the informal discussion which is to follow.

The 32d annual dinner will take place in the Roof Ballroom on Monday evening, January 11, 1932, at 7:00 p. m. Tickets $10.

A very interesting program has been prepared including a speaker of national importance.

Patentable Inventions

In the Rubber Industry

Joseph Rossman, Ph.D.

IT IS safe to say that practically every important development in the rubber industry has been patented. Since Goodyear obtained his U. S. Patent No. 3,633 for vulcanizing rubber in 1844, thousands of patents have been issued by the United States Government for inventions in the rubber industry. So important are patents that our large rubber companies maintain patent departments, and they carefully follow a consistent patent policy as a matter of good business expediency, probably on the principle that "patents help to give a monopoly in production, just as advertising helps to give a monopoly in selling. If, therefore, it is desirable to protect the good will of the sales department by advertising all the products which are sold, it is also desirable to protect the manufacturing department by patenting new developments throughout."

Value of Patents

Patents, in general, have a real value to the rubber technologist and manufacturer, just as in all other industries. Otherwise we would not witness the issuance of nearly 50,000 patents each year. Patents for practical and desirable improvements have an actual cash value, measured by the present and potential demand for them. Patents are not necessarily obtained for making direct profits. They are often very effective in scaring away competitors or in securing a monopoly in some field. The United States Rubber Co., for example, owns nearly all the important patents for using rubber latex. No one can, therefore, use their patented methods without securing their permission by means of a license agreement.

Patents also have an insurance value for the manufacturer who obtains patents not so much with a view to making profits from the inventions thereby patented as to assure himself that a competitor will not obtain a patent which would prevent him from carrying on his new developments. Patents are also sought by manufacturers to guard against an unfortunate situation in our patent system. According to the law, any invention in public use for more than 2 years cannot be patented, but the Patent Office has no direct facilities for investigating possible public use in each patent application and it, therefore, rarely rejects applications on the ground of public use. In order to protect himself, the manufacturer should, therefore, obtain a patent for any important improvement which he has developed, even though he may have a process or product in public use. Otherwise an unscrupulous competitor may obtain a patent for it, for the first manufacturer may have had the invention in public use and the competitor first learned of the invention from such use. An infringement suit may be thus filed against an innocent but honest manufacturer for infringing his own invention merely because he failed to obtain a patent for what he had developed, and thereby suffer the annoyance and expense of proving the invalidity of the patent—something not always easy or certain.

Patents a Good Investment

Many manufacturers make the mistake of not patenting their new developments because they see no immediate commercial value for them. An interesting illustration in point occurred in connection with the invention of diphenylguanidine as an accelerator. In 1916 G. D. Kratz, while with the Norwalk Tire & Rubber Co. prepared diphenylguanidine and demonstrated its utility as a rubber accelerator. Mr. Kratz then went with the Falls Rubber Co. where he further confirmed his results and in 1919 presented a paper at the American Chemical Society meeting describing his experiments. It also appears that in the Fall of 1917, 300 inner tubes were made using this accelerator, thus clearly indicating its commercial feasibility. Strange as it may seem, Kratz did not obtain a patent because the cost of diphenylguanidine was too high in 1916 to make it commercially practicable.

On November 12, 1921, Morris L. Weiss filed a patent application for diphenylguanidine as an accelerator, and the patent was issued on March 28, 1922. The patent was assigned to the Dovan Chemical Corp., thus giving it a monopoly against the entire rubber industry. By this time diphenylguanidine was produced commercially at a low cost, and this accelerator began to be used by a number of rubber companies. Suit was thereupon brought against the Corona Cord Tire Co., and also against the National Aniline & Chemical Co. Finally the Supreme Court considered the patent and held it as invalid because Weiss was not the first inventor and was therefore not entitled to a patent. (Corona Cord Tire Co. v. Dovan Chemical Corp., 273 U. S. 692.) The use of diphenylguanidine as an accelerator was thus open to the entire industry. Mr. Kratz, the original inventor, as well as his company thus lost valuable commercial rights worth millions today by failing to obtain a patent.

Patents have been valuable in promoting the progress of the industries through the publication of the latest achievements. It is no longer necessary to keep new developments in secret for they can be protected through patents and, therefore, they can be safely discussed in public so that in the long run the development of the industries is advanced. If it were not for patents, many important findings would be kept secret so that other workers would not be stimulated to further research. There would also be much overlapping and duplication of research work. This state of affairs would ultimately become a hindrance to industrial progress.

A research director of a large corporation has said: "Patent protection is vital to the proper development and continuance of industrial research. Without patent protection it would be impossible to obtain large appropriations for conducting the more expensive and long-continued types of industrial research. We conduct much research without thought of patent protection, and by publishing the results, contribute to the general advancement of industry. However, the cost of such research is often borne (or the expenditure made possible) by the financial returns from patented inventions."

Patent protection is without doubt one of the greatest incentives in the development of an industry. Many companies would not be justified in spending so much as they now do on their research departments in the absence of patents.

As William M. Grosvenor has said: "Unless there is security in intellectual property no group of business men

and investors is warranted in building an industrial and business structure thereon. They would be foolish to undertake the effort and expense of introducing the invention and educating the users. Why? Because any fly-by-night imitator, without the handicap of interest and amortization charges on the initial and development expenses, can make a profit at the actual cost of the pioneer and can drive him out of the business he has risked the time and money to build up."

Knowledge of Patent Essentials Valuable

Every rubber manufacturer and technologist should make an attempt to understand the fundamental principles of patent law in order to know when and how to protect any new developments they may make.

No manufacturer today dares to ignore the patent situation before going ahead with the manufacture of a new machine or product. An unknown patent in the hands of some one else may mean the loss of thousands of dollars besides possible complete exclusion from following out the new venture by a drastic court order prohibiting infringement of such patent.

There have been some bitter and costly patent suits in the rubber industry involving large sums. Many of these cases reached the United States Supreme Court. Since Goodyear obtained his patent for vulcanizing rubber nearly 150 patents involving rubber inventions have been litigated in the federal courts. Many patent disputes have never reached the courts, having been amicably settled by the parties themselves. It can be safely estimated that from 10 to 20 per cent of all patents issued prove to be extremely valuable to their owners.

Legal Basis for Patents

Patents are granted by the United States Government by virtue of the provision in our Constitution which states: "The Congress shall have power . . . to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

Although this authority is very broad, Congress has seen fit to grant patent protection for only a limited field of inventions by enacting the following law (Revised Statutes Sec. 4886): "Any person who has invented or discovered any new and useful art, machine, manufacture, or composition of matter, or any new and useful improvements thereof, or who has invented or discovered and asexually reproduced any distinct and new variety of plant, other than a tuber-propagated plant, not known or used by others in this country, before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country, before his invention or discovery thereof, or more than 2 years prior to this application, and not in public use or on sale in this country for more than 2 years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceeding had, obtain a patent therefor."

Legal Definition of "Art" or Process

The term "art" in this law includes any method or process involving a step or a series of steps or manipulations in obtaining a definite product or result. The patentability of a process need not be necessarily dependent upon any particular apparatus employed. In fact the apparatus used may be old and well known.

The Supreme Court has defined a process as "a mode of treatment of certain materials to produce a given result. It is an act or a series of acts, performed upon the subject matter to be transformed and reduced to a different state or thing. . . The process requires that certain things should be done with certain substances and in a certain order; but the tools to be used in doing this may be of secondary consequence." (Cochrane v. Deener, 94 U. S. 780.)

A process has also been defined as doing certain things with certain materials in a certain order; as a connected series of steps or operations for producing a physical result; an operation done by rule to secure a result; the subjection of a specific object to the influences of a specific force through a specific mode of application; the application or operation of some force, element or power of nature; ways or means to produce a result.

Many important process patents have been granted in the rubber industry, such as for methods of molding rubber articles, vulcanizing processes, methods of building tires and inner tubes, waterproofing fabrics, etc.

Legal Definition of Machine

The term "machine" in patent law embraces any mechanical device which has moving parts for performing a certain definite effect or result. Calenders, tire building machines, vulcanizers, extruders, bias cutters, etc., are examples of machines which can be patented.

Definition of Composition of Matter

The term "composition of matter" includes all chemical compounds, or intermixtures of chemical compounds, produced by chemical or mechanical operations, whether they be fluids, powders, or solids. The patentable essence lies in the qualities and the relation of the ingredients giving a result not possible by the use of only the individual ingredients in their separate state. The novelty of a composition resides wholly in its particular make-up, chemical or physical.

Chemical compounds cover compositions of matter within the meaning of the term. Rubber mixes, cements, accelerators, age-retarders, fillers, and pigments are also examples of a "composition of matter."

Complete Disclosure Necessary

The law (Revised Statute Sec. 4888) states that: "Before any inventor or discoverer shall receive a patent for his invention or discovery, he shall make application therefor, in writing, to the Commissioner of Patents, and shall file in the Patent Office a written description of the same, and of the manner and process of making, constructing, compounding, and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art or science to which it appertains, or with which it is most nearly connected, to make, construct, compound, and use the same; and in case of a machine, he shall explain the principle thereof, and the best mode in which he has contemplated applying that principle, so as to distinguish it from other inventions; and he shall particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery."

A patent for a "composition of matter" must, therefore, name or describe and give the exact proportions of the ingredients used in addition to describing how the ingredients are mixed or combined to give the desired result. Thus the Supreme Court has said: "Inasmuch as the discovery of a new substance by means of chemical combination is empirical, and results from experiment, the law requires that the description in a patent for such discovery should be specially clear and distinct." (Tyler v. Boston, 7 Wall, 327.)

Likewise in describing a process all the essential details and steps should be given so that an experienced rubber technologist could reproduce the results without further experimentation. In describing a machine the essential features should be given in the patent so that any expert machinist may make a similar machine.

(To be continued)

Mammoth Belt Press

This Machine Is Equipped with an Hydraulic Clamping and Stretching Device

A MAMMOTH belt and matting press, of German design, with over-all measurement of about 47½ by 12 ft. was installed last spring in the India Rubber Works, Silvertown, England. The makers of this equipment claim it to be the largest of its kind in the world. Other data denoting its weight, power, and capacity are: weight 260 tons, working pressure 10,000 pounds, and dimensions of heating plates 31½ ft. by 8 ft. 4 inches. For the manufacture of the various types of rubber belting the machine is equipped with an hydraulic clamping and stretching device.

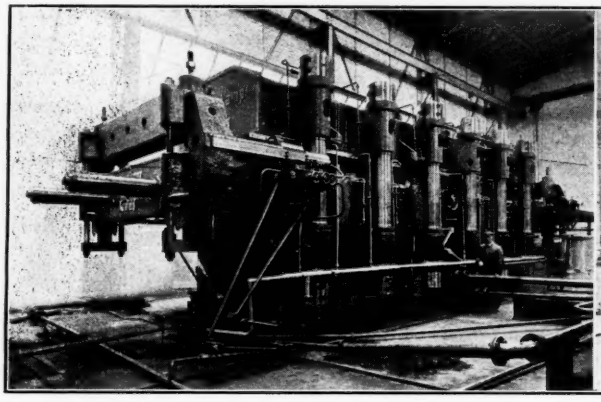
The press is operated by 6 double cylinders, the power of which is sustained by the press frame of 12 hammered steel columns, 6 on each side of the machine. Special devices are provided to compensate for changes in press pressure water is very small as the final lift is but slight.

3. With high pressure the low pressure water under 1,624 pounds' tension is conveyed to a pressure transmitter which converts the operating pressure as high as may be desired between 1,624 and 4,350 pounds. The pressure converter operates automatically and requires no special regulator service.

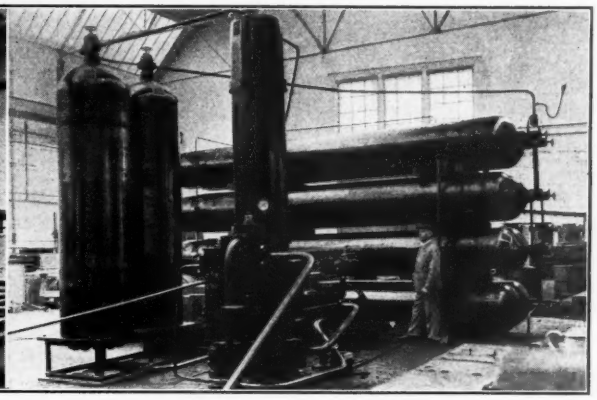
4. The return is effected by 8 return cylinders which are built for the full lift of the press and greatly accelerate opening the press. The return of the press is accomplished in a few seconds.

Air Accumulator

The accumulator supplied in connection with this press is also pictured. It is a pistonless compressed air mechanism practically 100 per cent efficient.



Siempelkamp Belt Press



Siempelkamp Compressed Air Accumulator

length due to heating and cooling. Provision also is made to counteract changes of level that may occur. The highly polished steel plates are heated by 10 independent steam compartments, each provided with thermometers. The system of heating prevents dead corners and the accumulation of water by compensating closure plugs. These are easily removable for cleaning deposits from the steam passages. Another special device insures exclusion of air during pressing and locking the press. Still another device provides self-acting hydraulic power that automatically exerts uniform lateral pressure on the guide irons and avoids the necessity of readjustment of the guide irons after each pressing operation.

Press Operation

The operation of the press is effected in 4 stages as follows:

1. Locking the press is done by means of only 2 double cylinders; while water flows to the other 8 cylinders from a container placed high. The time required for locking is about 10 seconds.

2. With medium pressure all 12 cylinders receive low pressure water at 1,624 pounds. The consumption of low

The accumulator is provided with a self-acting off and on device for the pump which switches the pump to "emptying" when the accumulator is full, and after a certain amount of water has been removed from the accumulator, switches back again. In the same way running below the low water mark is prevented. A certain amount of water, however, must first be present in the accumulator before it again releases working water. In this way a minimum content of water is assured in the accumulators, which is very important for many processes that, when once started, must be carried through to avoid spoiling the material. This guarantee against overflow or exhaustion of water is effected in a simple and reliable way without the aid of electrical accessory apparatus.

The bottoms of the 8 air jars, which are 700 mm. in diameter and about 6 m. long, are provided with flanges for closing. For the purpose of controlling the interior walls and renewing the coating these flanges are secured against air pressure by means of a water closing device. Collections of water can be removed in the simplest way. The entire press equipment is supplied with the most up-to-date recorders for water pressure and temperature.

EDITORIALS

Outlook Bright for 1932

DOES 1932 present for the average business concern a more propitious prospect than 1931? The answer may be confidently made in the affirmative; and in venturing a prediction hope may be quite discarded, a forecast being based solely on hard, essential facts and universal experience. On such sure footing only is it safe to figure reasonable probabilities. Certainly all the factors which must be considered in determining the future course of trade have been assuming a positively favorable aspect and warrant the belief that the coming year will witness a marked, substantial revival in general business.

Before good times begin all those forces that brought about dull times must be subjugated if not eliminated. Economists are quite agreed that great progress has been made in this direction. An admirable basis for a general upturn has been provided alone through deflation in industry. Drastic reductions in the cost of production and distribution have been made and economies introduced unbelievable in the flush period. One of the best lessons learned was the folly of over-expansion of plants and the making of more goods than the market can possibly absorb; a mistake few will care to repeat. Buyers' needs are mounting steadily; yet inventories of raw and finished goods have been kept close to the irreducible minimum.

Conditions precedent to the extension of credit have been well complied with, and as a result the interests that hold the purse-strings will in an ever-increasing degree supply on reasonable terms means to finance worthy enterprises. Basic commodities are at a price from which the only conceivable turn must soon be upward. Some are already swinging in that direction. Not only is domestic credit in a remarkably sound state, but signs multiply of an early adjustment of Europe's financial difficulties, any improvement in which situation will be quickly reflected in expansion of American export trade. Political expediency, too, is likely to impel powerful interests favorable to a continuation of the present administration to spur on business in the year of a national election.

The Dictation of Tire Prices

MAIL order chiefs have been credited with virtually coercing tire manufacturers into making the recent slash in tire and tube prices, but both sides deny that any such influence had been exerted. Yet if the "Barons of Big Distribution" actually attempted and succeeded in such an endeavor, should they be blamed? If, on the other hand, as some claim, the pressure for price paring were applied by dealers generally who believed that some such trade stimulus were needed in a quiet season, why should they be chided for seeking a possible quickener of business?

In some quarters the impression prevails that the tire makers yielded to both influences, just in what degree to either does not appear. Spokesmen for the tire makers, however, insist that the price cut was wholly voluntary and was not due to sinister banking pressure, as has also been hinted. Assuming that the latter statement is correct, it would be interesting to have a more amplified announcement than the one given out as to why any cut at all should have been made at a time when conditions were shaping themselves for a rise rather than a recession in prices.

Certainly there appeared to be no demand from consumers who have been getting more value than ever from tires; competition from "gyps" has been negligible and very moderate from retreaders; stockholders could not hope thereby to be benefited in dividends; there had been no accumulation of products that had to be disposed of urgently even at a loss; and most of all many tire-making concerns could ill afford such an adventure that would rather weaken than strengthen their slender resources. All of which but prompts the best friends of the industry to ask why it should not be made as profitable as any other, why there should not be more cooperation among its leaders for a real constructive policy, a true spirit of give and take, coupled with a declaration of independence of any possible outside dictation.

Chains and Independents Carry On

DESPITE the prophets of the new dispensation, the chances are that independent tire dealers will long continue to hold their own very well with the expanding chain stores maintained by large tire manufacturers. The dealers will persist because of their industry, enterprise, and wide acquaintance and because they fill a certain need in the community. Many of the independents offer easy terms, and there are numerous buyers who will always be willing to pay for credit and perhaps for some personal service going with it. Those that find satisfaction in paying cash will deal, of course, with the chain stores as well as with many independents who do not encourage instalment selling.

The independents, moreover, are being more vigorously backed than ever by the smaller but well financed tire manufacturers. The two seem to feel that they have much in common; so they are cooperating as they never did before, to their mutual advantage, and making more improbable than ever the extinction of all small dealers and the creation of one giant tire trust, as foreseen by perfervid Socialist agitators.

What the Rubber Chemists Are Doing

Oxidation Studies of Rubber, Gutta Percha, and Balata Hydrocarbons[1]

A. R. Kemp, W. S. Bishop, and P. A. Lasselle[2]

THE chemical and physical changes taking place in rubber, gutta percha, and balata as a result of oxidation have already been the object of many investigations. However on account of the difficult nature of the subject progress has been slow, and many questions concerning the mechanism of the oxidation process as well as the constitution of the hydrocarbons still remain to be answered.

In general oxidation reactions are likely to be very complicated. For example, Lenher has recently found that a simple material, such as ethylene, oxidizes to form dioxymethyl peroxide, acetaldehyde, formic acid, the oxides of carbon, hydrogen, and water in a stepwise manner. As regards rubber and gutta percha hydrocarbons, further complications are added by the fact that these materials have very complex and unknown structures.

The present paper gives an account of experiments carried out to determine more exactly the nature of the products resulting from the oxidation of rubber and gutta percha hydrocarbons when exposed to oxygen for several weeks or months at ordinary temperatures.

Materials and Procedure

The materials used in this investigation were crude Surinam sheet balata, Pahang and Goolie Soondie gutta percha, and the best grade pale crepe rubber.

The balata and gutta percha samples were purified by dissolving 50 g. of crude material in 1600 cc. of chloroform. The insoluble matter was completely removed by repeatedly shaking the solution with distilled water, allowing it to stand each time for about 1 wk. in the dark before separating the 2 layers, the insoluble matter remaining in the aqueous layer. The chloroform solution was then filtered into 5 or 6 times its volume of acetone. The hydrocarbon separated as a snow-white mass. After standing for several days the acetone was poured off and the precipitate redissolved in chloroform. The solution was again filtered and reprecipitated by allowing it to run slowly into 5 or 6 times its volume of absolute alcohol. Several reprecipitations were generally practiced. Throughout all operations an atmosphere of carbon dioxide was maintained over the solutions. The hydrocarbon was finally dried in a current of pure nitrogen at 40° C. or in high vacuum at 50° C.

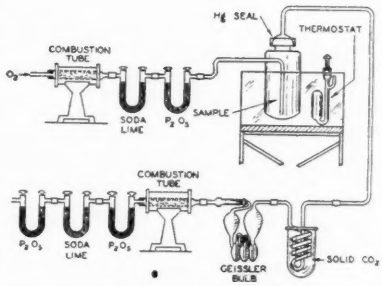


Fig. 1. Apparatus for Collection of Volatile Oxidation Products

These samples were 98.5 to 99.7 per cent pure, as determined by combustion and unsaturation. They contained only minute amounts of ash or nitrogen. The principal impurity was oxygen, apparently contained in substances very difficult to remove, but not believed to be oxidation products. The hydrogen-carbon ratio was in every case close to 1.60. These results are in conformity with those of several other investigators who have found it very difficult to remove the last traces of oxygen-containing impurities. Pure rubber hydrocarbon was prepared from acetone-extracted crepe, using diffusion methods similar to those employed by Caspari and Feuchter. This material was ash-free and contained only traces of nitrogen and oxygen.

Samples of the finely precipitated gutta percha and balata hydrocarbons were weighed into tared containers and placed in a vacuum-type desiccator exposed to diffused light in the laboratory. The opening in the lid was fitted with a rubber stopper containing an inlet tube, reaching to the bottom of the dessicator, and a short outlet tube. Dry oxygen at room temperature (20° to 30° C.) and at ordinary pressure was passed continuously through the system. The samples were removed periodically and weighed to determine their increase in weight. The rubber specimens in the form of sheets about 1 mm. thick received the same treatment.

A special apparatus used for the study of volatile oxidation products is shown in Figure 1. Purified oxygen was slowly passed over the sample, and the volatile oxidation products, which were liquid or solid at the temperature of solid carbon dioxide, were collected in the cooling coil and weighed. Carbon dioxide or other acidic volatile oxidation products, not collected in the cooling coil, were collected in a Geissler bulb, containing potash solution, and weighed. For the detection of other low-boiling volatile products, such as carbon monoxide, methane, etc., the residual gas was passed through a combustion tube, and the water and carbon dioxide determined.

Discussion of Results

The negative tests for aldehydes and ketones, the loss of moisture on heating, the acidity, the ease of saponification, the oxygen content, and the resin acid nature of the saponification products lead to the conclusion that the oxidized hydrocarbons are complex mixtures of hydroxy acids and lactones. It is of interest in this connection to note that Wallach obtained a hydroxy acid and a lactone as a result of oxidizing alpha terpineol. Abietic acid oxidizes in air and changes to an alcohol-soluble material which cannot be crystallized. It loses water upon heating and is believed by Henriques to be lactonic, but Dupont and Dubourg believe it to be a hydroxy acid.

Many previous investigators have ascribed molecular formulas to oxidized rubber, showing carbon and hydrogen atoms in proportion of 10 to 16 or a multiple thereof. These formulas are misleading, as non-homogeneity of the oxidized products together with the fact that the carbon and hydrogen ratio changes, owing to the splitting off of volatile matter, makes all of these formulas untenable.

Some investigators have also assumed that oxidation products of rubber and gutta percha hydrocarbons are closely related to the resinous components in the natural gums. The only connection between these materials is that they contain oxygen and dissolve more or less completely in acetone. The resins of gutta percha, balata, and rubber consist principally of sterol esters and are, therefore, chemically entirely different from the oxidation products.

Oxidation, like vulcanization, appears to

[1]Presented before the Division of Rubber Chemistry at the 82nd meeting of the A. C. S., Buffalo, N. Y., Aug. 31 to Sept. 4, 1931. *Ind. Eng. Chem.*, Dec., 1931.

[2]Bell Telephone Laboratories, 463 West St., New York, N. Y.

produce changes in the rubber in proportion to the quantity of oxygen entering into reaction. However it differs radically from vulcanization in being accompanied by decomposition of the hydrocarbon.

So much evidence has accumulated that there is a fairly general agreement among investigators in this field that the first step in the oxidation reaction of rubber, gutta percha, and drying oils, as well as many other unsaturated bodies, is a molecular addition of oxygen to the ethylene bond to form a peroxide.

The Bach-Engler theory of autoxidation considers an intermediate peroxide functioning as the catalyst. Moureu and Dufraisse have amplified and extended this theory to explain the oxidation of many unsaturated substances, including rubber. Stephens, however, has recently pointed out that autoxidation can be explained if a chain type of reaction is assumed; this is favored because the chain type shows a high degree of sensitivity to small amounts of inhibitors. Alyea and Böchstrom have shown that inhibitors of oxidation are destroyed in the process of being oxidized. The intermediate peroxides may, therefore, act as catalysts by oxidizing the inhibitors.

Stephens also points out that, if autoxidations owe their induction periods to the presence of inhibitors, intensive purification ought to shorten and eliminate eventually this stage. He finds supporting evidence for this conclusion in the case of purifying cyclohexane. The present authors have also noted a striking case of this in connection with oleomargaric acid glyceride from tung oil, which, when highly purified, oxidizes with extreme rapidity in comparison with commercial tung oil and shows little or no induction period. Rubber hydrocarbon is another good example. One must keep in mind, however, that any preheating of a sample during purification may also affect the length of the induction period. This may be due to preoxidation if the heating is not conducted in the absolute absence of oxygen, which condition is very difficult to realize.

The authors believe that the induction period involves the building up of a peroxide concentration until the energy level reaches a point where the chain mechanism can operate. Inhibitors may function to reduce the energy level by reducing the peroxide as most inhibitors are readily oxidized by peroxides. The oxidation of rubber and gutta percha is quickly initiated upon exposure to light, which action is in line with the already known relation of photochemistry to chain reactions.

It has been noted that the gutta percha hydrocarbon generally begins rapidly to oxidize and turn yellow at spots, which is also an argument for the chain-mechanism theory, as it is well known that contact surfaces, which in this case may be foreign particles, may have a profound influence on oxidation reactions.

If a straight-chain structure of rubber is assumed, the splitting of a methyl or methylene group to yield formic acid, formaldehyde, carbon dioxide, and water as accompanying reactions is a possibility. The oxidation of terpene hydrocarbons is a good example of this change where peroxide forms, followed by the splitting of the methylene group to yield formic acid and formaldehyde.

The continued combination of oxygen to the hydrocarbons does not stop with simple addition, as the final oxygen content is nearly double that of a simple addition product. In this respect oxygen reacts entirely differently from ozone, which forms an addition product.

The results indicate that the oxidized material contains compounds with at least 10, but more likely as many as 20 carbon atoms. The complex nature of these materials and their great resistance to being broken down into simpler units have so far been insurmountable obstacles in the way of their positive identification.

Rubber Division, A. C. S.

New York Group

THE meeting of the New York Group, Rubber Division, A. C. S., was held December 16 at the clubrooms of the Building Trades Employers' Association, 2 Park Ave., New York, N. Y. The affair was the annual Christmas party and attracted an attendance of about 200 rubber chemists, technologists, and invited guests. The program opened with an excellent turkey dinner.

Previous to the single technical paper on the program the following gentlemen were elected officers for the ensuing year: John P. Coe, chairman, and Peter P. Pinto, secretary-treasurer.

A technical paper on the applications of latex was read by J. Edwardes, of the Heveatex Corp., Malden, Mass. The author reviewed the chemistry of latex, the structure of the caoutchouc globule, and coagulation theories. Reference was made to latex compounding procedures and the results obtained compared with mill compounding of dry rubber. Latex is successfully utilized by the processes of dipping, electro-deposition, impregnation or saturation, and spreading. Commercial applications are made in the cases of paper and leather goods, dipped gloves, balloons, etc., brake lining, rubber thread, insulated wire sheathing, spread sheets, fabric proofing, cements, and sealing compounds.

C. S. Ching, director of industrial and public relations, United States Rubber Co., outlined briefly his observations and views on the influence of applied science on the development of industrial and business relations.

The serious features of the program were succeeded by a lively entertainment supervised by Prof. Baker, whose skill at magic and ventriloquism always arouses interest. Several musical numbers were rendered by the popular and gifted Walter H. Grote, who also gave a clever exhibition of sleight-of-hand.

The Christmas party concluded with the distribution, by lot, of a generous collection of useful articles contributed by many companies and firms associated with the rubber trade. The gathering adjourned at a late hour after passing a hearty vote of thanks to William H. Whitcomb, retiring chairman, and to the Executive Committee for presenting the highly successful program of the evening.

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Influence of Physical Properties of Carbon Black on Its Tinting Strength[1]

E. P. W. Kearsley and G. L. Roberts[2]

THE experimental methods employed and the results obtained by the authors are comprised in the following extract from their paper.

Experimental Methods

Standard methods of evaluation were employed exclusively as follows:

Oil-absorption numbers were determined by the method described by Heaton.

Rub-outs with a glass muller, using Green Seal zinc oxide and refined linseed oil as diluents, were used in obtaining the tinting strength, which was determined quantitatively in all instances.

The amount of volatile matter was obtained by the method reported by Johnson.

Moisture determinations were carried out for 2 hrs. in a constant-temperature oven at 110° C., the sample being spread in aluminum pans with close-fitting tops.

Interfacial tension of the dispersing mediums was measured by the method described by Gardner, a Donnan pipet was employed, and all readings were taken at 20° C.

Samples for compression experiments were prepared in a laboratory compressor especially designed for the work.

Effect of Particle Size

Four samples of carbon black manufactured under conditions productive of progressive decrease in particle size were examined for hiding power, tinting strength, volatile matter, and oil absorption. As expected, the values obtained for volatile matter and oil absorption evidence a progressive increase inversely proportional in the particle size. However, curves representing the hiding power and the tinting strength have a decided dip, especially in the case of hiding power. The explanation that suggests itself assumes two factors of opposed influence, one directly increasing in value as the particle size decreases, while the second, owing to greater thickness of the gaseous film surrounding the particle consequent on increased volatile matter, tends to decrease the values obtained.

Effect of Compression

A sample of black was subjected to increasing degrees of pressure and examined at the various stages of compactness. The tinting strength varied inversely with the pressure. It is to be expected that during compression agglomeration of the particles takes place, the size and the number being commensurate with the degree of pressure applied. It was believed, therefore, that the effect on the tinting strength was probably due to insufficient deflocculation during the rub-out caused by the limited wetting possible with linseed oil. To establish this point definitely further rub-outs were made with the addition of a surface-tension depressant, which would insure complete deflocculation. The results indicate that, when deflocculation is complete, precompression of a black has no direct influence on its tinting strength.

Effect of Heating

To ascertain to what extent removing the adsorbed gases from the carbon-black particle would affect its tinting strength, various samples representing different grades of blacks were subjected to a series of heat treatments ranging from 110° to 950° C. The results show that the tinting strength increases proportionately to the temperature or, in other words, inversely to the extent of the adsorbed gases which are present.

[1] Presented before the Division of Paint and Varnish Chemistry at the 81st meeting of the Amer. Chem. Soc., Indianapolis, Ind., Mar. 30 to Apr. 3, 1931. *Ind. Eng. Chem.*, Dec., 1931.

[2] United Carbon Co., Charleston, W. Va.

Microstructure of Rubber[1]

DESPITE the universality of rubber, there are strange and challenging gaps in our knowledge of its structure and behavior. What is the nature of its microstructure, and how does that structure vary under strain? What is the law of elasticity for finite deformations? Does rubber behave as an undercooled liquid or as a crystalline solid, or in other words, does it exhibit relaxation of stresses or plasticity?

In an effort to fill some of these gaps in our knowledge, Prof. H. Hencky, Massachusetts Institute of Technology, is conducting researches to determine the elastic properties of vulcanized rubber, and he has made available a memorandum of his progress. The microstructure of rubber, he believes, may be pictured as a homogeneous, amorphous, elastic jelly in which are embedded small, thin bars, stiff, crooked at the ends, and of equal length.

"If these bars are so small that they cannot be seen and distributed in the so-called regular disorder of statistical mechanics, we have a seemingly homogeneous substance with a microstructure. Every strain has a reenforcing effect, creating a web of more resisting substance. The mathematical treatment shows that the apparent modulus of elasticity for uniaxial positive stress increases more rapidly with increasing strain than by negative stress. Neglecting first losses of the elastic energy and assuming—with a certain mental reservation—ideally elastic behavior, we can describe the properties of the compound examined by 3 elastic constants.

"1. The bulk or compression modulus (K = 350,000 to 400,000 lbs./sq. in.)

"2. The modulus of shear (G = 8 to 10 lbs./sq. in.)

"3. The modulus of strain hardening (H = 55 to 60 lbs./sq. in.)

"A striking feature of rubber is the difference in size between the bulk-modulus and the other elastic constants connecting liability to change of form with great resistance to changes of the volume. The enormous capacity for storing up elastic energy which we find in rubber is owned by no other material. In a cubic inch of rubber we can store in a perfectly reversible manner an elastic energy of about 150 ft.-lbs., whereas we can get into a piece of the best modern steel of the same size, having 7 to 8 times the density of rubber, only 1/3 to 1/4 of that amount. Rubber, nevertheless, is not an ideally elastic material. In fact, no body built up from dancing molecules can behave ideally.

"There are two influences causing a measurable permanent set:

"1. Although plasticity—analogous to the metals—cannot be observed, certain fibers undergo rupture with increase of strain and naturally the strain increases with the frequency.

"2. The heat movement of the molecules causes a breakdown of the elastic stresses in the amorphous part of the rubber compound.

"This phenomenon, known also under the name thermal plasticity, can be treated theoretically. Relaxation and elastic afterworking are consequences of it. The relaxation time is the elastic constant needed for the mathematical description. Some days after a change in loading, or after releasing, the velocity of strain slows down to a negligible amount.

"In total we have, therefore, 4 constants with which we describe the elastic behavior of rubber: namely, the bulk modulus K, measuring the resistance to changes of volume; the modulus of shear, G, measuring the resistance to changes of form; the modulus, H, of strain hardening, measuring the influence of the reenforcing web on the changes of form; and the relaxation time, T, measuring the slowing down of relaxation and elasticity after workings."

Professor Hencky hopes to be able to show in a subsequent more detailed publication that finite deformations have the power to reveal the microstructure of a material. Once this microstructure is known sufficiently, he believes nothing can hinder a theoretical analysis which will shorten considerably the experimental work needed for the knowledge of a certain compound.

[1] *Technology Review*, M. I. T., Dec., 1931.

Latex and Its Applications

Rubber Latex

THE following, quoted from "Latex,"[1] refers to the source and nature of rubber latex.

"Natural latex is obtained from the bark (cortex) of certain trees by a process of tapping. A thin shaving of bark is cut away at each tapping to open up the ends of the latex vessels. These vessels permeate the inner layer of the cortex, and, when cut, the latex exudes. After a time the flow ceases.

"It is usual to leave the trees for one or more days before tapping again. This is the system universally applied in the East for tapping the Para rubber trees (*Hevea Brasiliensis*). There are other trees which yield latex of commercial value, but rubber from these forms only a small proportion of the total material available. Consequently the only latex obtainable commercially is that from the Para rubber tree. . . . . .

"Latex consists of minute particles of liquid, solid or semi-fluid material (rubber hydrocarbon) in suspension in a watery liquor or serum. Examined microscopically the particles are seen to be in oscillatory movement. This is entirely due to the smallness of the particles. The phenomenon was originally observed by the English botanist Brown in the case of pollen of plants, and is consequently known as "Brownian" movement. The smaller the particles, the greater and more violent the movement. The particles of most latices are so small that they remain suspended and do not readily settle out. If particles are heavier than the serum in which they are suspended, they will tend to gravitate to the bottom of the container, if lighter they will rise to the surface to form a denser layer in the same manner as fat globules of animal milk rise to the surface of cream. The particles of rubber latex are lighter than the serum; hence we talk of latex creaming."

[1] "Latex," Henry P. Stevens, consulting chemist to The Rubber Growers' Association. Issued by the Association, 2, Idol Lane, Eastcheap, London, E.C.3, England.

Concentrated Latex

SIDNEY MORGAN, acknowledged authority on rubber cultivation, in a comprehensive review of plantation practice[1] recorded the subjoined outlines of processes employed for concentrating latex commercially.

"Recent investigations have shown a number of directions in which this (concentration of latex) can be applied, and there are indications that the demand for concentrated latex is likely to expand."

The following are the best known processes for obtaining the product.

Hopkinson Process

Roughly, the Hopkinson process may be described as a method of evaporation of latex by dropping it upon a revolving hot plate, in a manner somewhat similar to that employed in the production of "milk powder." The resultant rubber particles are pressed into blocks, which contain a variable and small percentage of moisture. The process has been in considerable use in the Netherlands East Indies and Malaya by the company operating the patents; and large shipments are made to the United States.

Revertex Process

The Revertex process is under the auspices of Revertex, Ltd., and it is operated in Malaya and the Netherlands East Indies. Latex is treated with a protective colloid and evaporated in a horizontal steel drum heated by oil burners. Another rotating cylinder is inside, with its axis parallel to that of the outer drum. The result is that a thin film of latex is exposed continually to the heated atmosphere within the drum. The degree of evaporation is controlled to produce a concentrate of about 70 per cent in terms of dry rubber. The product is packed for export in 3-ply wooden cases coated internally with paraffin and has the consistency of soft cream cheese. As the name implies, the process is reversible, and a stable latex can be reformed by suitable manipulation with water.

Utermark Process

The Utermark process is in operation in the East by the Dunlop Rubber Co. The latex is concentrated by centrifuging in a special adaptation of a "separator," such as that of the well-known Alfa-Laval type. It is understood that the centrifuge employed runs at about 8,500 r.p.m.

Ammonia is added as a preservative, and a dry rubber content of 60 per cent is obtained. If a protective colloid were added, a higher concentration of rubber could be obtained, but it is understood that for general purposes and for certain specific reasons it is preferred to rely upon a uniform concentration of 60 per cent. The product, of course, is reversible on treatment with water and is capable of application not only in the rubber world but also in other industries.

Investigations conducted by the *Journal of the Rubber Research Institute of Malaya* (January, 1929), showed that concentrations up to 70 per cent easily were obtained by adding to latex 0.5 per cent of potassium hydroxide, and 1 per cent of a soap such as the following: Sodium stearate, sodium oleate, or sodium pelmitate.

For certain trade processes the presence of a caustic alkali is held objectionable. Hence there are demands in certain directions for an alkali-free concentrate; while for other purposes the presence of caustic alkali offers no impediment to trade application. At present it would appear that where the caustic alkali would be inimical to an application in commerce, the manufacturer must be content with a slightly lower dry rubber percentage.

It is commonly claimed for evaporated latex that considerable economy in motive power is effected during the mixing with sulphur and other ingredients preparatory to vulcanization. The moist concentrate is used directly in the rolls, the heat of which completes evaporation and the vulcanized product is superior, for some purposes, in physical properties and "aging" qualities. Investigations are being continued, and it seems probable that new applications will be found possible. Already very satisfactory results have been obtained in combination with paper, leather, and wood-pulp.

[1] "Recent Progress in Plantation Practice Leading to the Development of Wider Uses for Rubber." Paper read at the International Congress for the Development of Applications of Rubber, Paris. *Bull. Rubber Growers' Assoc.*, Sept., 1931, pp. 418-23.

Vulcanized Latex

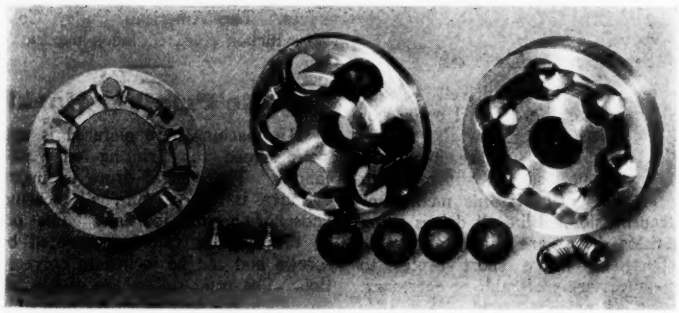
THE original process of vulcanizing latex consisted in treating it with certain vulcanizing ingredients in solution. A fabric or other material dipped in or spread with the mixture is a finished and vulcanized article when dry. The process appears to give large scope in many directions, and many applications have been found in spreading in the paper industry, in leather work, etc.

Latex Brake Linings[1]

THE success with which latex has been used in various fields has led to its employment for binding the asbestos fibers of brake linings. Brake linings so treated share the advantages of other latex products: they are more resistant to wear and have greater tensile strength than those of masticated and calendered rubber. Because of direct precipitation of latex on the asbestos fibers, distribution of latex is very uniform; consequently the coefficient of friction remains practically constant at all temperatures met with in ordinary use of brakes. Road tests showed that even after latex bound linings had become wet they rapidly regained their normal qualities. These linings have excellent aging properties; they show no signs of bleeding at high temperatures and no adverse effects after being exposed to a temperature of over 300°C. (572°F.) for 3 hours; whereas in other types of linings considerable swelling took place at this same temperature.

[1] *Gummi-Zeitung*, Oct. 2, 1931, p. 20.

New Machines and Appliances



Crocker-Wheeler Flexible Coupling

Rubber Ball Coupling

THE use of rubber for absorbing shock in automobile construction is well known and has proved most efficient in conserving the machines and contributing marked increase in riding comfort. This facility of rubber to absorb shocks and dampen vibration has now been applied to flexible couplings for shafting.

As pictured in the disassembled parts of this clutch, the flange half has 6 cylindrical pockets. These are all parallel to the shaft and connected by a circular groove.

The other half, or spider, has 6 projecting lugs between which are placed rubber balls to absorb the shock.

When the coupling is assembled, the balls occupy the pockets in the flange. As torque is applied, the lugs on the spider half squeeze the balls which carry the load to the other half of the coupling. All the balls are in compression regardless of the direction of rotation.

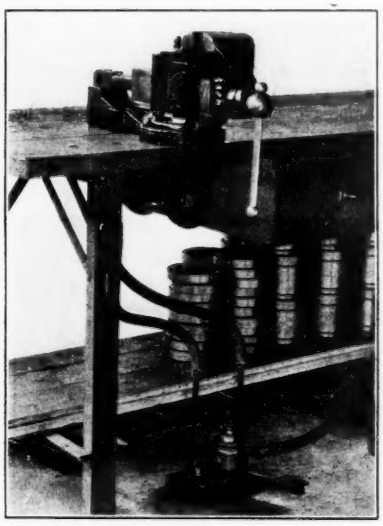
The balls may be removed without disturbing the position of either half of the coupling on the shaft. This removal is accomplished by taking off the cover shown at the left in the disassembly view. The balls may then be pushed out through holes in the spider half by a rod inserted through small holes in the flange half.

With the balls removed, the driving shaft is entirely disconnected from the load, a feature useful for testing purposes. Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.

Vise Operating Attachment

THE portable instrument, here pictured, is operated by an air-cylinder attachment which allows the operator the use of both hands to manipulate the work. A feature of this mechanism is the simplicity of its installation. The vise is mounted on a steel casting which is secured through the bench to a plate underneath which holds the cylinder. The attachment can be adapted to any standard bench vise, retaining the original stroke and fine screw adjustment on the vise.

In service the jaws of the vise can be set to the required distance by the regular screw and, when the foot valve is depressed, the air cylinder operates the vise. The equipment is made for pressures of 1,600, 3,600, and 6,500 pounds. The vise can be equipped with a foot valve to hold the vise in either position and is valuable



Pneumatic Bench Vise

in the machine shop or tool room by reason of its elements of safety and facility in operation. The Tomkins-Johnson Co., Jackson, Mich.

Automatic Trimmer

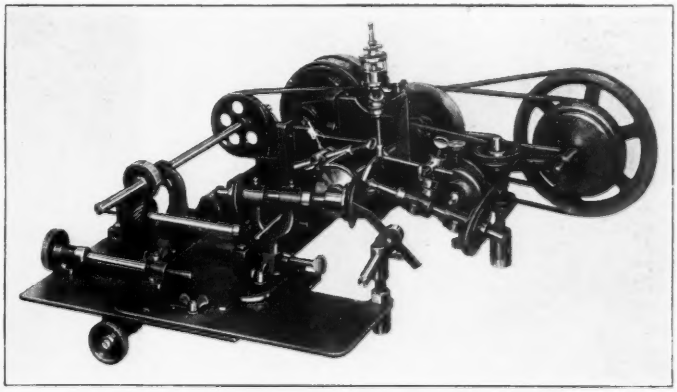
IN THE production of small molded rubber articles an automatic trimming machine is a positive necessity, as many such articles cannot be trimmed by hand properly. The improved trimmer here shown is the latest device for trimming circular rubber goods both inside and outside or outside only. The shearing effect is accomplished by 2 circular shearing knives held in place at right angles to each other.

This fundamental principle is universally acknowledged to be correct. Further details of the machine construction are as follows:

The countershaft running parallel on the machine base is connected to the right-angled shaft at the front of the machine by 2 spiral gears, forming a right-angled countershaft. The spiral gears are held stationary, and the 2 shafts slide through each gear on keys. The bearings of the front countershaft are located on the table at the front of the machine. The table is constructed as a compound rest and is provided with 2 knurled hand wheels. The upper wheel moves the table into, or away from the knives, and the lower wheel moves the table to the right or left as desired.

A bearing stand is connected to the table in front of the knives. A shaft is mounted therein, and the belt driven from the right-angled countershaft. The shaft held by the bearing stand supports and revolves the trimming dies. Provision is made on the bearing stand to turn the shaft on an obtuse angle to the knives. This is an important feature in trimming circular sleeves made in a 2-part mold with the overflow located in the center, or rubbers measuring ¼-in. diameter or less.

A trimming die is required for each size of goods, the object being to center and revolve them. The dies are standard for small goods and screw into the end of the trimming die shaft. The larger sizes are fastened to the shaft with a set screw. Mounted on the right hand side of the shearing knives is an adjustable inside trim-



Morris Improved Automatic Trimming Machine

ming knife. The illustration shows the knife removing the inside rind from the rubber ring held by the trimming die at the trimming position. A light pressure on the knife removes the inside rind, and withdrawing the hand automatically returns the knife to a position below or level with table. T. W. Morris, 6312 Winthrop Ave., Chicago, Ill.

Skid Handling Truck

A NEW four-wheel drive skid handling truck is here pictured. It is small enough to work in box cars, yet carries its loads of 3,000 pounds in an overhung position. The skids are the lowest possible and hence the most economical. The skid height need only be 2 inches below the platform. They can be made easily from scrap lumber, using 2- by 4-inch boards on their flat sides for the legs. Having these legs run the full length of the skid gives a "web-footed" effect so that the skid is more stable, when stacked, than one having high legs at the corners. There is also no tendency for the board skid legs to damage the goods on the underneath skid load, when stacked, as so often occurs with the four-corner type of skid leg.

Both the travel and the elevating speeds of the new truck enable it to perform work unusually fast. Having a four-wheel, four-motor drive, the truck travels 10 m.p.h. empty and 7-9 m.p.h. with 1½-ton load. The elevating speed varies from 25 to 40 feet a minute with the standard motor but increases up to a maximum of 60 feet a minute if a special high speed hoist motor is used. The loads are carried in an overhung position with no wheels directly under the load. The overhung design enables tiering skids without the aid of a helper.

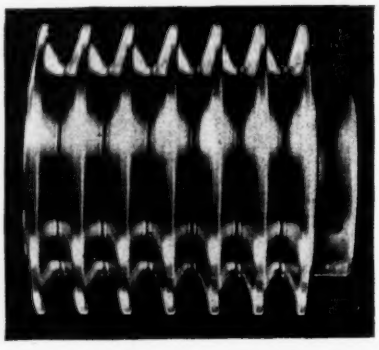
The truck is operated from a storage battery, which is in a steel compartment placed over the wheels at the driver's end to act as a counterbalance. A maximum counterbalance is obtained by locating the battery, hoist, etc., as far away from the load as possible at the opposite end of the frame. With the four-wheel drive the greater the load, the greater the traction.

Speed with safety is obtained on these trucks by using such devices as: an automatic stop on the up-stroke of the table; two independent sets of brakes, mechanical on two wheels and electrical on four wheels; controls located within outer edges of truck at all times. Terminal Engineering Co., 17 Battery Place, New York, N. Y.

Wedgbelt Drives

THE term "wedgbelt drive" is the trade name for the grooved pulleys or sheaves manufactured for use with V-section belts. These pulleys are made for the most part of pressed steel and represent the latest development in this method of power transmission. Like all drives using V-belts these drives are chiefly applicable for installations where short center to center distances are preferable or necessary. The continued efficiency and life of V-belts depend to a large extent upon the qualities of the driving pulley or sheave. It is at this point that the belt is chiefly strained by flexing and friction. Therefore any improvements in the driving pulley which will reduce belt wear are of utmost importance.

Wedgbelt pulleys such as here pictured offer a number of important advantages. Thus, the smooth surfaces of the grooves resulting from the use of bright steel stampings, neither scored nor roughened by tool marks, provide ideal contact. Their accurate construction assures correct angular relation to the belt and uniform belt stress regardless of the number of grooves. The pressed metal sections insure rapid dissipation of frictional heat and, being non-abrasive, reduce belt wear to a minimum. Their almost perfect balance makes them suitable for high speed service such as is usually demanded in motor drives. The American Pulley Co., 4200 Wissahickon Ave., Philadelphia, Pa.



Wedgbelt Pulley Drive

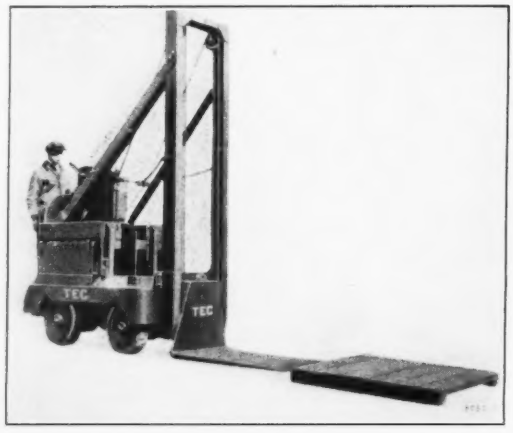
Fabric Printing Machine

THE machine here pictured is specially designed for printing on rubberized fabrics. The central drum or impression cylinder is carried in ball bearings or phosphor bronze journals. The position of the cylinder can be regulated by top screws and can be locked in correct position. The print rollers are of special steel on which the pattern to be printed is engraved.

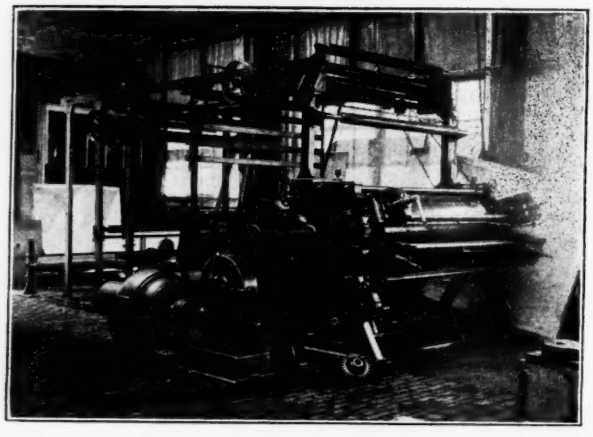
The method of operation is as follows: The impression cylinder is wrapped with cloth as padding. Over this wrapping an endless rubber or felt blanket is rotated, running on to and away from the drum in a vertical direction, thence over rollers to a stretcher or compensator arrangement by which the blanket is kept tight. A piece of material usually termed a "back gray" is also run through on top of the blanket to protect it from the color. This blanket is not endless but is fed from a batch, taking the direction of the blanket past the stretcher arrangement, under the heated chests to a return batch on the same stands.

The material to be printed is threaded around the cylinder taking the direction of the back gray, leaving it at the top, and running over heated chests to be batched up at the delivery end. The cylinder rotates by contact with the print rollers, which are gear driven from a shaft on the frame of the machine.

Registration means are provided by which the pattern of one roller can be made to coincide with the others. The doctors are accurately adjusted and weighted to press against the print roller at an angle toward the direction of rotation, and they are oscillated laterally by means of a cam on the cylinder shaft. Bradbury, Saunders, Ltd., Radcliffe, England.



Model B TEC Elevating Truck



Three-Color Rubber Printing Machine

New Goods and Specialties

Rubber Casters

LOOK at the floor in your office. Does it show signs of wear from inefficient casters? To eliminate such unsightliness, and nervous strain on the part of the office staff, try rubber tired office chair casters such as made by the Darnell Corp., Ltd., Long Beach, Calif. These provide ease of movement and full protection of floors and help save equipment.

The tires on these casters are either of soft rubber or hard rubber fiber. The former is designed for use on soft composition floors, wood, tile, marble, terrazzo, or concrete; while the latter is primarily for use on carpeted or other covered floors.

Wheelbarrow Tire

TIRES on wheelbarrows! Why not? Especially when many advantages are claimed for this innovation. In offering the Dunlop pneumatic tire for such service Macinlop, Ltd., Cambridge St., Manchester, England, states that the usefulness of barrows used by builders, contractors, gardeners, gardening or sports field contractors, etc., is greatly increased when the barrow is fitted with these tires. Thus a bigger load can be carried by the workman because the pneumatic reduces jarring and makes the barrow easier to wheel. Wheeling also is not so tiring; consequently work is accelerated, and more loads are wheeled per hour. This tire enables wheeling over soft ground which would not support an ordinary barrow wheel, nor will the load damage soft gardens and sports fields. Work, moreover, need not wait for dry weather but can proceed without fear of damaging the ground. A wheelbarrow equipped with such a tire can easily be wheeled over obstructions and projections; thus fewer gangways and planked runs are required.

The Dunlop wheelbarrow tire can be fitted to any barrow in a few minutes by removing the spindle brackets and replacing them with the spindle of the new wheel and tire in position. The tire is inflated with a cycle pump and is said to give years of service even under the heaviest conditions.

This equipment comes in two sizes. For loads up to 5 cwt. a pneumatic 16 by 4 is offered. The specially built heavy duty tire is ideal for use in brickworks, tileries, quarries, factories, and workshops where rough floors and heavy loads are experienced. Complete equipment includes tire, tube, wheel, and spindle. Replacements of wheel and spindle, cover, and tube may be had.

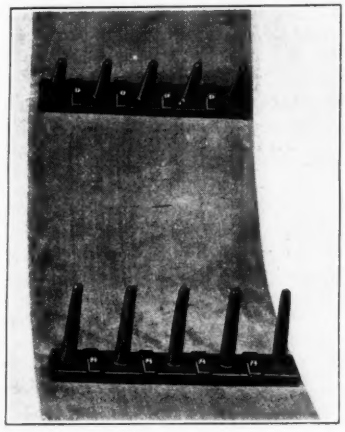
Rubber-Spiked Distributer

FOR cotton gins now is available the Diamond Rubber-Spiked Distributer Belt, an improved product that is claimed to have many advantages. Among these are: the belt is easy to install, economical in use, and effects substantial economies in operation. This belt, furthermore, prevents damage to the saws of the gin and insures against sparks that cause fire losses. It, consequently, saves many expensive repairs. The value of this rubber-spiked belt has been tested in actual service.

The construction of the belt is interesting. It is made with four plies of strong belt fabric and rubber. The flexible, firm, heavy spikes, integral with a strong hard rubber bar, have between them countersunk bolt holes through which special bolts are inserted for attaching the spikes to the belt. For this purpose special bolts, washer, and clamp are used. The bolt passes first through the washer, next through the belt from the underside, then through the hard rubber bar and the clamp. When the bolts have been tightened, their split ends are spread by inserting a chisel in the slot and striking a single blow with a hammer. The heads of the bolts and the washers are flush with the undersurface of the belt. No grooves in pulleys are needed to accommodate bolt heads.

The Diamond rubber-spiked distributer belt comes in ten- and twelve-inch widths The former boast five spikes, and the latter six. Each length of belt is furnished with enough spikes, bolts, washers, and clamps to place the rows of spikes sixteen inches apart. They should not be placed any closer.

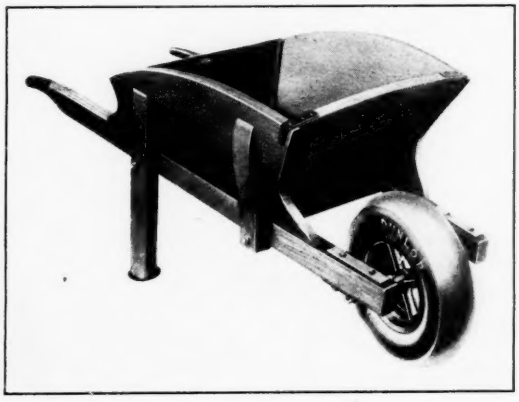
This belt is reported to handle successfully all grades of cotton, even wet boll cotton in bad ginning condition. Diamond Rubber Co., subsidiary of The B. F. Goodrich Co., both of Akron, O.



Belt with Spikes Attached

Hood Rubalosh

CLUMSY galoshes have passed into the limbo of undesirables. The modern overshoe, even of rubber, must mold itself with slenderizing grace to every curve of foot and ankle. Hence the Hood Rubber Co., Inc., Watertown, Mass., has achieved for its galoshes a new clinging stretchableness that insures "silk stocking fit," assuring feet as smartly shod on rainy days as on sunny ones. The Rubalosh, of lightweight rubber, is made with a talon fastener or with three glove snaps on the side. Women's sizes are made on low, semilo, medium, regular, and high lasts, and come in tan, brown, and gunmetal two-toned effects as well as blue and black monotones. Misses' and children's sizes are offered in tan, brown, and black with semi-rolled edge outside.

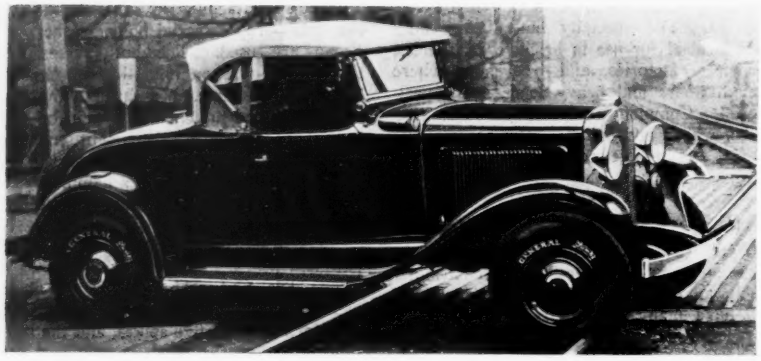


Barrow Equipped with Dunlop Pneumatic Tire

Rubber Galosh

Rubber Industry in America

OHIO



The Photo Laboratories

NEW TIRE "FLOATS" OVER LARGE OBSTRUCTIONS

Carrying a car smoothly over railroad tracks, curbstones, deep ruts, or chuck-holes in roads, the new Streamline Jumbo tire, just announced by The General Tire & Rubber Co., Akron, marks the first advance over the old, "doughnut" type of round balloon tire. It is built to run on 12 pounds of air. Attached directly to an enlarged hub, no wheel is required with this tire, which has been under development for 2½ years.

Goodrich Activities

The B. F. Goodrich Co., Akron, through General Tire Sales Manager C. B. O'Connor, announced the combination of its eastern and central sales divisions to be known as the eastern division, which includes New York, Boston, Philadelphia, Cincinnati, Detroit, and adjacent territory. The new division will be under the management of Robert McTammany, former central division manager, with headquarters in Akron. The combination follows the recent death of Eastern Division Manager George B. Campion. A new southeastern division, with headquarters in Atlanta, was also announced, with H. B. Thackston, former district manager at Atlanta, becoming division manager.

E. T. Morris, Goodrich assistant advertising manager, has resigned to become account executive in Meldrum & Fewsmith, Inc., a Cleveland advertising agency. Mr. Morris joined Goodrich 4 years ago after several years in advertising work in Cleveland and Chicago and became district advertising manager for Goodrich with headquarters in Philadelphia. A year later he was appointed advertising manager of Pacific Goodrich Rubber Co., Los Angeles, Calif., and after two years returned to Akron in charge of Goodrich tire advertising.

Goodrich tires in the future will be sold and serviced at the Shell Petroleum Co.'s service stations in the Indiana division. This announcement came after a meeting on November 24, where more than 100 filling station operators attended and heard talks by Shell and Goodrich officials. Fifteen stations have already been stocked with Goodrich tires, and the remainder will be so equipped in the near future.

Regional Meeting A.S.T.M.

The Third Regional Meeting of the American Society for Testing Materials will be held at the Hotel Cleveland, Cleveland, Wednesday, March 9, 1932. The technical feature of the meeting will be a symposium on rubber products. An important objective of the program is the dissemination of increased knowledge concerning rubber and rubber products among those outside the rubber industry so as to aid engineers in applying rubber products to their particular needs and to assist in the preparation of proper specifications.

Committee D-11 on Rubber Products is cooperating with the District Committee in arranging the technical program.

Firestone Tire & Rubber Co., Akron, through Vice President Harvey S. Firestone, Jr., has contracted with Lawrence Tibbett, Metropolitan grand opera singer, making him the regular star of the "Voice of Firestone" radio program. Mr. Tibbett's premiere in his new role will be on Monday evening, January 4, at 8:30 o'clock, and again at 11:30, Eastern Standard Time, and will continue on succeeding Mondays through the entire winter season.

Canton Rubber Co., Canton, O., druggists' sundries manufacturer, is reported to be planning to establish a plant in England for the manufacture of rubber gloves.

Amazon Rubber Corp., 1796 E. Market St., Akron, manufactures tires, tubes, molded goods, and does special custom work. R. C. Fulmer acts as president, vice president, and purchasing agent; while E. C. Sheldorfer is secretary-treasurer.

India Tire & Rubber Co., Mogadore, through President W. G. Klauss announced a most satisfactory report for the first 10 months of 1931. Sales for the period totaled $3,665,299, and the gross operating profit was $505,952.50, with the net approximating a quarter million. No comparison was made with last year's figures because of the shortened fiscal period. Stockholders voted to reduce capitalization from $1,075,272 to $458,277 and to change the 83,651 ½ shares from a par basis to no par value. India now has wiped out its deficit and is in a position to resume dividend payments on preferred stock, passed since January 1, 1929. The company has also announced a new tire and battery program and a doubled independent dealer outlet for 1932.

Officers are: President Klauss; J. M. Alderfer, chairman of the board; George W. Merz, vice president; Sterling Alderfer, secretary; Lester V. Baker, treasurer; and John T. Fisher, comptroller. Directors include the company's president, its vice president, and its chairman of the board, Philip R. Mather, F. J. Andre, T. E. Borton, and H. L. Williams.

Goodyear Tire & Rubber Co., Akron, builder of the *U.S.S. Akron*, world's largest airship, also builds inflated comic figure balloons featured in street parades and as flying advertisements atop stores and theaters.

Annual Thanksgiving Day parades of two New York, N. Y., department stores this year were marked by a new group of these balloons including a dragon 110 ft. long; a 2-headed giant 53 ft. tall; two cats 55 and 45 ft. long; a 50-ft. hippopotamus; a terrible Turk 30 ft. tall, and others.

Ranging in capacity from 4,600 cu. ft. to 1,200 cu. ft. each, most of these mammoth figures are inflated with helium, the non-inflammable gas used in the cells of non-rigid airships. At the conclusion of the big parades each year the comic figure balloons, each ballasted with several hundred pounds of water to make them travel more slowly and farther, are released on self-directed flights to goodness-knows-where.

While several of the balloons were designed, tailored, and painted and all were built in the Goodyear aeronautics department, some were designed and painted by Tony Sarg, the famous cartoonist.

Swan Rubber Co., Bucyrus, at a special meeting of stockholders on November 21, effected a complete reorganization of its board of directors and its financing program. Mort G. Nussbaum, clothier of Bucyrus, was elected president and treasurer to succeed H. A. Paxton.

Members of the board include Mr. Nussbaum, Robert W. Priebe, Isaac Nussbaum, J. M. Strelitz, and E. W. Wood. The volume of business during 1931 was very satisfactory, state company officials, who have favorable prospects of increased business during 1932. A new plant department for manufacturing brake lining is now being equipped which will occupy 8,000 sq. ft. of floor space. The plant employs 40 persons and 11 sales offices are maintained by the company.

General Tire & Rubber Co., Akron, directors have declared the 58th consecutive dividend of $1.50 per share on the company's preferred stock, payable on December 31 to stockholders of record December 21. The company has maintained an unbroken record of dividend payments ever since its organization in 1915.

Standard Statistics, Inc., New York, N. Y., in a recent survey of the American export field as affected by the British tariff revealed that The B. F. Goodrich Co. and the Goodyear Tire & Rubber Co., both of Akron, are included among the American manufacturing companies who will benefit by the anti-dumping tariff which England has adopted. They both have plants in Canada and England; so they will be able to produce goods for the British market direct from their plants in England or ship them duty free from the Canadian plant.

Whitehead Bros. Rubber Co., Trenton, still maintains a 5-day week and the same number of employes.

Mexican Synthetic Rubber

Production of automobile tires, rubber heels, and other rubber products from synthetic rubber made from petroleum will soon commence in Mexico City, according to press reports.

Julio Tellez Giron, research chemist who perfected the process after 17 years' experiment, states that the Compania Hulera Mexicana, of which ex-President Plutarco Elias Calles is president, would have a plant in operation by January which would produce between 300 and 400 tires and 5,000 rubber heels daily.

NEW JERSEY

The rubber situation in New Jersey changed but little in the past month. Mechanical rubber goods production decreased slightly, but the decline is expected at this season. Tire production also shows some decrease. Little change occurred in the hard rubber goods output; while factories making brake lining report normal business. The approach of Winter, however, has resulted in more orders for footwear and rubber heels and soles.

The Citizens' Committee on Unemployment and the **Red Cross** at Trenton received large donations from Pocono Rubber Cloth Co., The Thermoid Company, Acme Rubber Co., Murray Rubber Co., Essex Rubber Co., and the Puritan Rubber Co.

Murray Rubber Co., Trenton, suffered damage by fire recently. The blaze broke out in the storeroom and destroyed several tons of crude rubber, and some packing. The automatic sprinkling system prevented the blaze from causing a heavier loss.

I. Ely Reed, secretary of the Mercer Rubber Co., Hamilton Square, upon his return from a trip through the South, said he found business conditions a little improved.

Lambertville Rubber Co., Lambertville, announces production with the advent of winter weather.

Luzerne Rubber Co., Trenton, announces that business shows some improvement over last month.

Tyson Bros., Woodbridge, maker of factice, is said to be considering the building of a plant for manufacturing rubber substitute in Gardner, Mass.

James P. Flynn, superintendent of the Puritan Rubber Co., Trenton, has been on an extended business trip through the South and the Midwest. The company continues to operate normally.

The Thermoid Company, Trenton, was well represented and had a large display at the recent annual convention of the National Association of Automotive Parts at Atlantic City. Among those who attended were Robert J. Stokes, president; Joseph O. Baur, secretary-treasurer; F. Robert Lee, vice president; J. A. Wigley, superintendent; and heads of several departments. Arthur B. Dougall, for several years Thermoid district manager for Maryland, Delaware, and the District of Columbia, has been appointed sales promotion manager of the automotive division.

Joseph Stokes Rubber Co., Trenton, finds business showing a healthy growth; so it now has enough orders on hand to operate with a full force until February 1. The demand for automobile battery boxes has improved. The Canadian plant at Welland, Ont., is also reported busy.

Woven Steel Hose & Rubber Co., Trenton, continues to operate normally and has been busy throughout the Fall and early Winter.

Essex Rubber Co., Trenton, has been operating 5 days a week for the past 6 months, with the same number of workers. President Clifford H. Oakley, fully recovered from a recent operation, has returned to his duties.

Pierce-Roberts Rubber Co., Trenton, reports increased business of late. It now has enough orders on hand to operate normally until late Winter.

Rubber Manufacturers' Association of New Jersey at its well-attended annual meeting at the Trenton Club, Trenton, December 8, reelected the following officers for the coming year: president, John A. Lambert, president and general manager, Acme Rubber Co.; vice president, I. Ely Reed, vice president, Mercer Rubber Co.; secretary, Charles E. Stokes, Jr., vice president, Home Rubber Co.; treasurer, Horace B. Tobin, president, Woven Steel Hose & Rubber Co. Preceding the election was a dinner.

Jules Hauvette Michelin, of the Michelin Tire Co., Milltown, who is on a business trip to the United States, arrived in New York on December 9. Mr. and Mrs. Michelin visited their home on College Avenue, New Brunswick. The Michelin Company is sponsoring the introduction of the "Micheline," pneumatic-tired railway coach successfully tested in France, into the United States. Several of these cars are scheduled to arrive soon in New York on the French liner *De Grasse*.

The new French passenger car, equipped with Michelin, pneumatic tired wheels, is vastly more economical in operation over the larger trains. According to M. Raoul Dautry, director of the French State Railways and vice president of the French (Steamship) Line, this new type of car on some of the French railways will be the means of providing more acceptable transportation at lower costs. The illustration shows the comparative size of the old and the new trains.

— MIDWEST —

Hood Rubber Products Corp. has announced the appointment of R. J. Jones, former Boston and New York branch manager of The B. F. Goodrich Footwear Corp., as manager of its Minneapolis branch. Mr. Jones has been associated with the rubber industry for 18 years. In the Minneapolis position he succeeds A. S. Biesing, former Hood branch manager, who is now merchandising manager for the combined companies in Chicago, and N. B. Lathrop, former Goodrich manager.

W. C. Gray, for nearly the past 4 years manager of publicity and sales promotion work for the W. A. Sheaffer Pen Co., Ft. Madison, Iowa, has resigned his position and expects to return to Northern Ohio where he has spent the most of his business life. Mr. Gray formerly handled the publicity, house publication, and sales-by-mail work for a large Akron rubber company.

Crown Products Co., Omaha, Nebr., although it has no connection with the Crown Rubber Co., which discontinued operations two years ago, among its personnel lists several of the associates of the former firm. The present company manufactures a complete line of automobile accessories including fan belts, radiator hose, flaps, etc. The concern recently purchased the property and buildings of the Howard Stove Works, Ralston, Nebr. The Crown company reports that within the last 10 months its shipments have covered the entire United States as well as Canada and Mexico. Officers are Dwight Williams, president; Bert C. Ranze, treasurer; Glenn B. Williams, secretary; Wade E. Sheppard, superintendent; and Wm. G. Parks, sales manager.

Auburn Rubber Co., Auburn, Ind., since its reorganization about a year ago has been successful in increasing its business about a third in dollar volume, despite low prices and adverse market conditions. The principal products are cement applied half soles, sport soles and heels, sponge knee pads and regular half heels, and several specialties including soap dishes, bath mats, and fly swatters. These products are distributed through three channels: chain stores, shoe manufacturers, and jobbers in general hardware and shoe findings fields. Auburn executives are A. L. Murray, president and general manager; Thos. J. McKeon, factory manager; C. H. Hanna, secretary-treasurer; Fred D. Eberly, sales manager; and D. M. Sellew, superintendent.

— EASTERN AND SOUTHERN —

The Monroe Sander Corp., 39-25 21st St., Long Island City, N. Y., manufacturing a general line of enamels, lacquers, and paints, specializes in rubber lacquers. Officers are: Monroe H. Sander, president; Eugene G. Bloch, vice president; and Elliott V. Wright, secretary.

Vulcanized Rubber Co., Morrisville, Pa., reports that some lines of hard rubber production have increased during the month.

Pacific Mills, cotton division, is now located at 214 Church St., New York, N. Y.

The Servus Rubber Co., Rock Island, Ill., footwear manufacturer, recently opened a New York sales office at 200 Church St., with James A. Clark in full charge of Servus New York sales. He has been with the footwear industry since 1925, and from 1928 to 1930 was eastern sales manager for The B. F. Goodrich Co.

William B. Wiegand, of Binney & Smith Co., New York, N. Y., recently resigned as chairman of the A.S.T.M. Rubber Products Committee D-11. His resignation was accepted with regret, and resolutions in appreciation for his service as chairman for the past 2 years were extended. Until the biennial election next June, the activities of the committee, at its unanimous request, will be directed by Vice Chairman C. R. Boggs, Simplex Wire & Cable Co., Boston, Mass., as acting chairman.

Goodyear Tire & Rubber Co., Gadsden, Ala., through officials of the company announce that beginning January 4 the company will increase production from 4,000 to 5,000 tires daily. This change will mean an increase from the present schedule of 3 6-hour shifts, 4 days a week, to 3 8-hour shifts, 5 days a week.

Kavalco Products, Inc., Nitro, W. Va., filed in the federal court, December 1, an answer in the injunction suit brought by the Monsanto Chemical Works, St. Louis, Mo., and the Rubber Service Laboratories Co., Akron, O. The defendants in the case are C. Olin North, Winfield Scott, and the Kavalco Products, Inc., all of Nitro, W. Va.

The answer categorically denies any breach of contract of fraudulent use of secret chemical processes as alleged by the plaintiffs in connection with the manufacture of phenolphthalein, triphenol phosphate, or tricresyl phosphate, and asks that the suit be dismissed.

The Naugatuck Chemical Co., 1790 Broadway, New York, N. Y., through Vice President E. B. Curtis, announced the absorption of The Rubber Regenerating Co., of the same address. Effective January 1, 1932, production and sales of reclaim rubber formerly handled by The Rubber Regenerating Co. will be handled in the name of The Naugatuck Chemical Co.

The Naugatuck company reports that the management of the enlarged Naugatuck Chemical Co. will be under the direction of Elmer Roberts, president. Production will be under John P. Coe, factory manager, assisted by John Caskey, assistant factory manager; Philip Rice, superintendent of the chemical department; and Donald McCollum, superintendent of the reclaim department. Research and development will be under the direction of M. G. Shepard, chief chemist.

Sales will be directed by E. B. Curtis, vice president. Sales of latex, lotol, and dispersions will be directed by M. C. Teague. Sales of heavy chemicals will be under William Valentine, and the sales of plastics, varnishes, and aromatics under G. P. F. Smith. Direct contact with the rubber goods manufacturers on chemicals, reclaims, etc., will be continued by R. E. Casey, W. O. Hamister, E. H. Nahm, and G. C. Follett.

Fenner, Beane & Ungerleider is the new name of the company formerly known as Fenner & Beane, crude rubber broker, 60 Beaver St., New York, N. Y.

Woodworth Specialty Co., Binghamton, N. Y., maker of Easy-On and Handi-Chains, has added R. B. Tracy to its staff as sales manager. Mr. Tracy was formerly factory representative of the Michelin Tire Co. and is well known in the automobile and the tire industries.

Foster D. Snell, Inc., 130 Clinton St., Brooklyn, N. Y., consulting chemist and engineer, recently announced that Harry J. Hosking had resigned his position in the research laboratory of the Roessler & Hasslacher Chemical Co., Niagara Falls, N. Y., to join the Snell organization in a similar capacity.

Motor & Equipment Association, 250 W. 57th St., New York, N. Y., will hold its annual banquet, which is one of the brightest features of the National Automobile Show Week, on Wednesday, January 13 in the Grand Ballroom of the Hotel Astor at 7 p. m. There will be no speech making at the banquet, and the guests will be entertained by professional talent.

Godfrey L. Cabot, Inc., 940 Old South Bldg., Boston, Mass., manufacturer of carbon black, through Treasurer Thomas D. Cabot, reports that the company has erected club houses at its Armstrong, Bowers, Skellytown, and Kingsmill plants for the use of its employes and their families where tournaments and other activities will be held. Each building contains pool tables, bridge and domino tables, a library, and a lounging room furnished with leather hotel lobby furniture.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Aetna Rubber Co	Pfd.	$1.75 q.	Dec. 31	Dec. 15
Baldwin Rubber Co	Class A	$0.37½ q.	Dec. 31	Dec. 21
Dominion Rubber Co., Ltd	Pfd.	$1.75 q.	Dec. 31	Dec. 23
General Tire & Rubber Co	Pfd.	$1.50 q.	Dec. 31	Dec. 21
General Tire & Rubber Co	Pfd.	$1.75 q.	Jan. 2	Dec. 15
Goodyear Tire & Rubber Co. of Cal	Pfd.	$1.75 q.	Jan. 2	Dec. 18
Goodyear Tire & Rubber Co. of Can	Pfd.	$1.75 q.	Jan. 2	Dec. 15
Goodyear Tire & Rubber Co. of Can	Com.	$1.25 q.	Jan. 2	Dec. 15
Mason Tire & Rubber Co	Com.	$1.21	Nov. 28	Nov. 23

NEW ENGLAND

Rubber Thread Consultant

William J. O'Brien, who has now entered the consulting field, has spent his entire life in the rubber thread industry. Born in Westchester, N. Y., he later moved to Easthampton, Mass., where at an early age he joined the Easthampton Rubber Thread Co. as office boy, working up to the position of superintendent. He remained with the company 20 years. Next he entered the employ of the Empire Rubber Co., Trenton, N. J., for a period of ten years. Following this position Mr. O'Brien spent a year with the Provodnik Rubber Co. at Riga, Russia. He returned in 1910 to spend the next 11 years with The B. F. Goodrich Co. at Akron, O., leaving in 1921 to construct and superintend the Chatham Mfg. Co., Portland, Conn., for a decade.

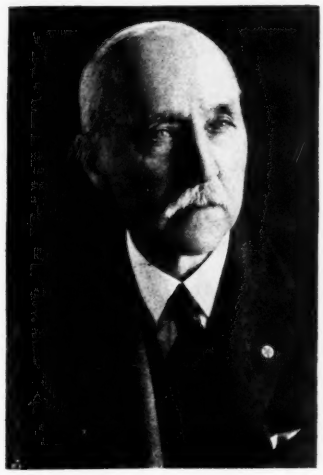
Mr. O'Brien is perhaps better acquainted with the manufacture of rubber thread for elastic webbings and golf ball thread and tape than any other man in the country today. He is married and resides with his family at 255 Main St., Portland, Conn.

The Goodyear Rubber Co., Middletown, Conn., manufacturer of boots and shoes, at a recent stockholders' meeting elected a new board of directors at the proposal of 4 local banks holding a total of $120,000 in notes and a mortgage on the Goodyear plant. The new directorate, several of whom are returned, includes: Harold S. Guy; Charles M. Park, treasurer and general manager of the company; Arthur V. McDowell, vice president; T. Macdonough Russell; Francis A. Beach; Charles T. Davis; Charles L. Wetherbee; Frederick B. Fountain; and John P. Bacon. The company is now enjoying a period of good business and has enough sales to keep the plant working at full time for the next 7 weeks.

Firestone Cotton Mills announced that commencing December 14, a 10 per cent wage cut would go into effect both at its Fall River and New Bedford plants, both in Mass. The corporation also stated that its mills would operate at full capacity, 5 days and 5 nights each week throughout the Winter, giving steady employment to a large number of operatives. Fabric will be put in storage and held until such time as it can be used.

Charles A. Dana, receiver of the Fisk Rubber Co., Chicopee Falls, Mass., denied the rumor that the firm would be sold or liquidated, stating that the concern is in excellent condition and "has plenty of money in the bank." He indicated that Fisk is going to remain an independent factor in the tire industry.

Moore Fabric Co., Pawtucket, R. I., manufacturer of elastic and non-elastic webs, has branches at 79 Madison Ave., New York, N. Y., and 729 Milwaukee Ave., Chicago, Ill. Officers are John V. Moore, who serves as president, treasurer, and purchasing agent; E. R. Moore, vice president; and James G. Connolly, secretary.



Godfrey L. Cabot

Cabot Fifty Years a Leader in Carbon Black

In November, 1822, a youth went from Boston to the wilds of western Pennsylvania, where a brother had preceded him and had engaged in the production of natural gas and its by-product—carbon black, then a little known substitute for lamp-black. Before long, he was joined by his brother, and from that time forward the name of Godfrey L. Cabot has been identified with the scientific and commercial progress of the carbon black industry. He has followed the development of natural gas fields westward and southward until today the corporation bearing his name operates a group of great carbon black factories, one of these being the largest single plant of its kind in the world. The corporation produces gas from over 400 wells, and annually transports 70,000,000,000 cubic feet of gas through nearly 600 miles of pipe line, drawing from over 150,000 acres of owned and leased territory.

There has been drama in plenty in this black and sooty substance, by reason of the difficulties of production, the great financial risks and particularly because carbon black itself measured in comparatively few tons and comparatively few dollars, is vitally essential in industries which count the annual value of their products by hundreds of millions of dollars.

Godfrey L. Cabot was the first trained chemist to embark in the production of carbon black. Active as ever, after half a century of business, he has always been guided by science in the development of his industry. Laboratories have been the controlling factors in the development of his business.

Anyone who reviews the record of early production of carbon black and its emergence from an experiment into an industry of world-wide importance cannot help noting the frequent recurrence of the name Godfrey L. Cabot in connection with invention and improvement in mechanical processes and devices, as well as in chemistry and the control and uniformity of the product. The value of all of this work to the industries using carbon black is well nigh incalculable and the end is not yet, for the younger men with whom Mr. Cabot is surrounded are carrying on with the same principles and ambitions that have dominated the Cabot business for fifty years.

Godfrey L. Cabot, Inc., 940 Old South Bldg., Boston, Mass., remains, as always heretofore in the complete control of the Cabot family. Thus is assured the continuance of the policies and practices which have proved so valuable to the industry.

William D. Egleston Co., New England sales agent for the St. Joseph Lead Co., 250 Park Ave., and the Ansbacher-Siegle Corp., 50 Union Sq., both of New York, N. Y., on January 1, 1932, moved from 133 Pearl St. to 34-38 Midway St., Boston, Mass., where it will have combined storage and office facilities.

The Merrimac Chemical Co. has moved from its old quarters in Woburn to its new plant at Everett, both in Mass.

William A. Donovan, sales supervisor of The B. F. Goodrich, Boston, Mass., branch, has completed 20 years service with the company.

Arthur H. Marks, director and member of the executive committee, The B. F. Goodrich Co., Akron, O., has been named president of the Aeolian-Skinner Organ Co., Inc., with activities directed from Boston, Mass. The new company is the result of a merger between the Skinner Organ Co. and the Aeolian Co.

New Incorporations

The American Flexible Conduit Co., Inc., of New Bedford (Mass.), $50,000. J. H. Abrams, president and treasurer, A. M. and M. J. Abrams, all of New Bedford, Mass. To manufacture armored cable, electric equipment, and accessories.

Auto Rubber Co., Inc., Dec. 3 (N. Y.), 200 shares, no par value. A. M. Leslie, B. King, and H. K. Jessop, all of 220 W. 42nd St., New York, N. Y. Automobile tires, etc.

Goodwear Rubber Co., Inc., Dec. 1 (N. Y.), $10,000. H. Pensky, R. L. Ain, and M. Sheransky, all of 39 Union Sq., New York, N. Y. To manufacture rubber goods of all kinds.

Prince Rubber Co., Inc., Dec. 9 (N. Y.), 500 shares, no par value. S. W. Prince, 885 Niagara St., Buffalo. A. L. Gilman, 115 Gresman Terrace, and J. F. Traynor, 83 Vermont St., both of Rochester, all in N. Y. To manufacture rubber products.

Sponge-Ayre Seat Co., Inc., (N. Y.), 200 shares, no par value. P. H. Hodgson, 114 Ashland Ave., H. H. Woods, 196 North St., and R. M. Andrews, 189 North St., all of Buffalo, N. Y. To manufacture rubber seat cushions.

PACIFIC COAST

The rubber trade on the West Coast has watched with close interest the effect on sales of the recent cut by major companies in the prices of tires and tubes. So far the result is disappointing. Consumers were not so much impressed as some trade leaders had expected them to be; in fact, they seemed to regard the cut as not the ultimate one but rather the forerunner of more to come; and buying has been oddly hesitant although an excellent potential demand is known to exist. Some large distributers maintain that a moderate increase in price would have had a much more stimulating effect on sales, and they cite many past experiences in support of their contention. As they put it, if buyers find that they must meet one advance they hasten to purchase lest other rises are in prospect. Some dealers are disappointed because prices on second-line tires did not receive a similar cut; yet they are pleased that no more special discounts will be allowed on national and commercial accounts, on which sales will henceforth be made solely on a wholesale schedule that will be available to all able to buy on that scale.

Goodyear Tire & Rubber Co.'s president, Paul W. Litchfield, was a mid-December visitor at the California Goodyear plant in Los Angeles, Calif. He had made a stop with two other company officials, L. B. Tompkinson and E. O. Malnquist, at his ranch at Litchfield Fork, Ariz. Mr. Litchfield stated that, operating with the fleet in a tactical program the *U.S.S. Akron*, world's largest lighter-than-air craft, will maneuver over Southern California early in February on its first visit to the Pacific Coast. It is also likely that the big airship will make a trip with the fleet to Hawaii. Mr. Litchfield regarded business prospects as encouraging although he did not expect any rapid improvement. One very hopeful sign, he said, is shown in the tire and rubber business in that consumption is slowly forging ahead of production. He also stated that a slight reduction would be made in Goodyear's cotton acreage in Arizona, where 18,000 acres are being cultivated to provide cord for tire fabric.

Seiberling Rubber Co. held its annual sales conference of Pacific states dealers at the Hotel St. Francis, San Francisco, Calif., December 16, with an exceptionally large attendance. The guest of honor was President Frank A. Seiberling, who had just returned with Mrs. Seiberling from a short trip to the Hawaiian Islands, and who planned to return to Akron at Christmas. Mr. Seiberling spoke very optimistically of company prospects for 1932, tire sales of late having shown a notably upward trend. As to the general business situation, he remarked that, contrary to the belief of many, business was not bad on the whole, but rather in spots, especially in the larger industrial centers, much less in agricultural centers, and markedly diminishing westward. The country is on the way up, he said, even though the change for the better may not yet be very noticeable, and in 1932 conditions will have become largely normal again. Speaking of labor conditions, Mr. Seiberling said that the trend is plainly down in the number of working hours and days.

Boston Woven Hose & Rubber Co. finds business keeping up well in the northwest section embracing Washington, Oregon, and northern Idaho, which is served by the J. B. Lippincott Co., with headquarters at 1720 Smith Tower, Seattle, Wash., the manager for which is S. B. Riser.

Stringfield & Oedekerk, manufacturer of rubber and bakelite molds and plastic goods, moved in December from 762 E. Slauson Ave. to the new building erected by the firm at 1702 E. 61st St., Los Angeles, Calif. Their working space has been doubled, and they report that business is unusually brisk. Mr. Stringfield was formerly chief chemist at the Goodyear plant in Los Angeles.

Pacific Goodrich Rubber Co., Los Angeles, Calif., had 85 representatives from 11 western states at its mid-winter sales conference at the Hotel Huntington, Pasadena, Calif. It was stated that a study of the reports justified an immediate and substantial raising of 1932 sales quotas. Assurance was given by company executives that the merchandising force would be generously aided with extensive advertising. Among those who spoke were Vice President and General Manager T. B. Farrington, General Sales Manager F. E. Titus, Merchandising and Advertising Manager R. E. Jeffers, and District Manager F. L. Hockensmith, all of Los Angeles; District Manager R. J. Loomis, of San Francisco, and the following from the parent Goodrich works in Akron, O.: Manager of Sales Promotion Guy Gundaker, Jr., Manager of Tire Development K. D. Smith, Goodrich Silvertown General Manager Joe Woodlock.

The General Tire & Rubber Co., retail sales in the San Francisco, Calif., area will be handled solely by the Gurley-Lord Co., with headquarters at 11th and Mission Sts., according to Western District Manager Dan A. Kimball and Roy Doss, San Francisco branch manager. Mr. Kimball states that business on the Coast has of late been very encouraging and he counts on a large increase in 1932.

Adolf Schleicher, head of the Samson division of the United States Rubber Co., and founder of the Samson corporation, pioneer tire manufacturer in Los Angeles, has been nominated president of the Chamber of Commerce in that city. Nomination is generally equivalent to election.

United States Rubber Co. is directing sales of New York Belting & Packing Co. products from its Pacific Coast headquarters, 300 2nd St., San Francisco, Calif. H. B. Chandlee, manager of mechanical sales for the U. S. Rubber Co., having taken full charge since the recent death of A. H. Gregory, who had been Coast manager for the N. Y. Belting & Packing concern. L. M. Simpson, general sales manager, tire division, U. S. Rubber Co., Detroit, Mich., has been busy for several weeks on the Coast outlining selling and advertising plans with leading distributers. On part of his trip he was accompanied by J. B. Magee, general sales manager, western tire division, and John Ferris, manager of the San Francisco tire division. The Samson factory of the company in Los Angeles is running at full capacity in all departments.

Firestone Tire & Rubber Co. of California is operating its Los Angeles plant on practically full production 5 days a week with 4 6-hour shifts daily. The new plan for distributing employment among a much larger number of employes is said to give much satisfaction. Vice President and General Sales Manager R. C. Tucker has returned from a conference with executives of the parent Firestone company in Akron, O., and H. V. Tompkins, manager of truck and bus tire sales, has gone there on a similar mission.

National Latex Co., 410 Ardmore St., Southgate, adjoining Los Angeles, Calif., has been planning a large addition to its equipment to accommodate the addition of the business of the J. G. Gross Co., which has been manufacturing automobile accessories in San Gabriel, Calif., and Akron, O. A larger calender and more mills and presses may be added. The company, of which I. W. Robertson is general manager, does much latex dipping and specialty work and has a large force working on an 8½-hour shift 5 days a week. Its new equipment will enable it to do a much more extensive range of work.

New Publications

"Annual Report of Director of the Bureau of Standards to the Secretary of Commerce for the Fiscal Year Ended June 30, 1931." U. S. Department of Commerce, Washington, D. C. This report known also as "Miscellaneous Publication No. 131" contains the revised chart of organization of the Bureau of Standards. A review is given of the work and the expense of the activities of the Bureau, and the appendix has a general financial statement tabulation.

"More About Certified Black." Godfrey L. Cabot, Inc., 940 Old South Building, Boston, Mass. This attractive brochure is devoted to the product improvements embodied in Cabot's certified carbon black. These relate specifically to specifications on grit, curing properties and accelerator adsorption control, processing properties and dispersion, also the presence of moisture. The booklet is most readable from the standpoint of the rubber chemist and compounder.

OBITUARY

Benjamin Thomas

PNEUMONIA aggravated by the unpleasant duty of discharging so many employes of the Hood Rubber Co., Watertown, Mass., subsidiary of The B. F. Goodrich Co., Akron, O., caused the death on November 22 of Benjamin Thomas, associated with the Hood company in various capacities for 35 years.

He was born in Waltham, Mass., on April 29, 1873, and educated in his native city. When a young man he went to Minnesota to work in a lumber camp for 5 years. He then returned to his home town and joined the Hood company, first in charge of the bookkeeping and auditing department and then for a long time as comptroller of the Watertown plant.

Mr. Thomas was a charter member of Russell Lodge, A. F. & A. M., and Menotomy Royal Arch Chapter, Arlington, where he lived for the past 21 years, and also a life member of the Isaac Parker Lodge, Waltham.

Surviving are his widow, 2 sons, and 2 sisters. Funeral services were held at St. John's Episcopal Church, Arlington, on November 24. Following cremation at Mt. Auburn, the ashes were interred in Mt. Pleasant Cemetery.

Edward J. Brown

EDWARD J. BROWN, former resident of Trenton, N. J., and for a number of years a traveling salesman for the Acme Rubber Mfg. Co., Trenton, died December 9 at his home in Lansdowne, Pa., after a twenty-four hour illness. He left Trenton some years ago to become affiliated with the Hood Tire & Rubber Co., Pittsburgh, Pa.

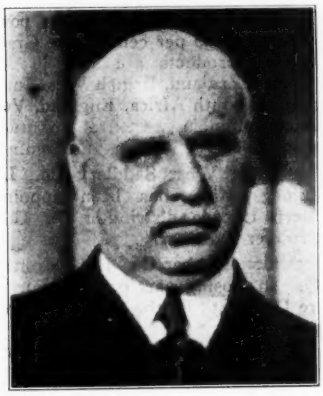
Mr. Brown is survived by his widow, 2 brothers, and 4 sisters. Burial was in St. John's Cemetery, Trenton.

President of Hoggson & Pettis Mfg. Co.

ON NOVEMBER 13 death removed from the ranks of executives of The Hoggson & Pettis Mfg. Co., New Haven, Conn., its president, George Philip Stephan, whose loss can never really be refilled, especially in the hearts of those who knew and loved him. He had been with the company ever since July 1, 1875, and during the last 12 years was its president.

Mr. Stephan was born in Meriden in 1861. While he was still an infant, however, his family moved to New Haven, where he later attended the public schools.

When he left school in 1875, he was apprenticed to learn the die sinking and engraving trade to Samuel J. Hoggson, founder of the Hoggson & Pettis company. The business was incorporated in 1882, and Mr. Stephan became one of the stockholders. In his early days with the company the bulk of the work was for rubber goods factories, and his services were in constant demand. Mr. Stephan went to different parts of the United States and Canada to engrave calender rolls and molds and to give instruction and advice for their proper operation, particularly for the footwear industry.



George P. Stephan

Surviving are his widow, their 2 sons, 4 grandchildren, a sister, and several nephews and nieces. To all of them deepest sympathy is extended in their hour of bereavement.

George S. Squires

AFTER being in poor health for 2 years, George Seymour Squires, superintendent of the Reading Rubber Mfg. Co., Reading, Mass., for 21 years before his retirement in 1929, died at his home in Reading on December 5.

The deceased was born in Naugatuck, Conn., April 10, 1870. He later attended the local public schools.

In 1868 he started in the rubber business with his father, Cyrenius N. Squires, pioneer rubber man associated with Charles Goodyear. George Squires was superintendent of the Columbia Rubber Co., Boston, Mass., from 1892 to 1898, when he joined the I. B. Kleinert Rubber Co., New York, N. Y. In 1906 he became superintendent of the Milford Rubber Co., Milford, Mass. Three years later he went to the Reading company, where he remained until his resignation in 1929.

George S. Squires

Mr. Squires invented a pneumatic tire, as well as processes and machinery used in manufacturing auto top material. He became a sportsman and great lover of outdoor life. He also owned a large cranberry bog on Cape Cod.

Surviving are his widow, 2 sons, 6 daughters, and 2 brothers. Requiem Mass was held at St. Agnes's Church, Reading, on December 8, and burial was at Laurel Hill Cemetery.

Edward Carlisle

EDWARD CARLISLE, 80, retired rubber worker, died recently at his home in Trenton, N. J. He had been employed for many years by Home Rubber Co., Trenton, but was forced to retire several years ago because of old age. Burial was in Riverview Cemetery, Trenton.

Former Rubber Executive

WILLIAM L. BLODGETT, former executive of the Hamilton Rubber Co., Trenton, N. J., died December 10 at his home in Florida after a lingering illness. Mr. Blodgett was affiliated with the Hamilton company for many years and was prominently known among the rubber industry. He left the rubber company in April, 1918, when he moved to Florida.

He was born near Hartford, Conn., and went to Trenton, when young, to join the rubber company as office boy. He successively was stenographer, chief clerk, and branch manager. In 1898 he acquired an interest in the Hamilton company and became secretary-treasurer, the position he still held when he resigned.

The body was brought to Trenton and interred in the family plot in Riverview Cemetery, following services at the grave.

Surviving him are his widow and 2 sons.

Book Review

"Colloid Chemistry, Theoretical and Applied by Selected International Contributors." Collected and Edited by Jerome Alexander. Vol. III. First Series of Papers on Technological Applications. The Chemical Catalog Co., Inc., 419 Fourth Ave., New York, N. Y. 1931. Cloth, 655 pp., 6 by 9 in. Illustrated. Indexed.

This volume comprises a total of 42 papers of which 11 are on general principles; 6 deal with mechanical and specialized matters; 25 relate to geology and mineralogy including metals, petroleum, asphalt, and agriculture. This book is a most valuable manual for chemists and technologists in industry. The collected papers are eminently practical, and their value has been enhanced by their editorial treatment.

CANADA

The inauguration of cooperative buying in rubber footwear through the York Trading Co., Toronto, "started something" in the rubber footwear trade. The manufacturers who did not sell to the York company were not inclined to see their trade go by the board; so they opened up a price war. All kinds of rumors prevail about discounts given, and under present conditions a dealer is somewhat uncertain about whether or not he is getting the best possible. What the sequel will be remains to be seen.

Present booking prices on garden hose are applicable on orders received before the end of the year, and are protected against change until June 30, 1932. Since prices were issued, manufacturers report a fair amount of business; but they anticipate bigger orders toward the end of the year.

Considerably more interest is developing in hockey as the major league games begin; so sales of pucks are showing gradual development.

The weatherstrip market is experiencing improved consumer demand due to colder weather. December business in stores is expected to be much better than that for November.

Tire & Rubber Duckpin League includes the following rubber companies: Gutta Percha & Rubber, Ltd., Goodyear Tire & Rubber Co. of Canada, Ltd., Canadian Goodrich Co., Ltd., and Firestone Tire & Rubber Co. of Canada, Ltd. The last league standing shows the first 3 named companies as all having played 4 games and lost 2.

Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., closed its fiscal year in December, with profits more than sufficient to cover the dividends on preferred and common stocks. As the current fiscal period covers 15 months, common stock earnings for that period of more than $6.25 a share are indicated.

The Goodyear Trophy, donated for annual competition among members of the Model Aircraft League of Canada, was won this year by Wm. Mountford, of Regina, Sask. A replica of the trophy has been sent him for permanent keeping.

C. W. Harshman, Goodyear assistant manager of the sole and heel department, while in St. John, N. B., recently, reported a splendid atmosphere of confidence in the Maritime Provinces. Mr. Harshman incidentally believes that this part of the country is better off than the rest of the Dominion.

George Davis has acquired the Dundurn Station at Main and Dundurn Sts., Hamilton, Ont., after having been associated with the Firestone Tire & Rubber Co. of Canada, Ltd., this city, for many years. He is well known in Hamilton fraternal circles.

Granby Elastic Web Co., Ltd., Granby, P. Q. A story in "Contact," house organ of the Southern Canada Power Co., Ltd., featuring "Home Industries" in the district to which it supplies power, mentions that 25 per cent of the Granby company's products are sold in Australia, New Zealand, British West Indies, Argentina, South Africa, England, Venezuela, Columbia, Central America, Mexico, Norway, Sweden, and Denmark.

The Great West Saddlery Co., Ltd., Winnipeg, Man., has been appointed Western Canada distributer for Goodrich rubber footwear.

Dominion Rubber Co., Ltd., Montreal, P. Q. In closing part of its factory on Notre Dame St., E., the end of December because of economic necessity, President W. A. Eden, stated that only the rubber footwear manufacturing branch was to be closed; so employes in other departments were not affected in any way. It is understood that the company will divert its footwear orders to the factories at Kitchener, Ont., and St. Jerome, P. Q., where work for some of the men locally employed may be found. It is understood that 400 employes were affected by the shutdown and that efforts are being made to transfer all employes with dependents to the plant at St. Jerome. The bulk of the personnel, however, were girls. Officials of the company state that it will be necessary to employ 200 additional men at the Kitchener plant.

M. L. Douglas, general sales manager of the Dominion company, Tire Division, Kitchener, Ont., in an interview on business conditions during a visit to Vancouver, B. C., reported sales to have been well over last year's, and the business outlook justifies the view that the company's tires will have a still greater turnover in 1932. During 1931 there was an increase of 50 per cent over 1930 in Dominion tires for original equipment in spite of a recession in motor car production.

Stedfast Rubber Co., Granby, P. Q., established in Granby a few months ago, has installed additional equipment for new lines.

National Battery Co., St. Paul, Minn., U. S. A. Vice President, George P. Castner was in Winnipeg, Man., recently inspecting sites for a Canadian branch. Decision to open a plant in Canada was reached largely because of the effects of Dominion tariffs.

W. H. Miner, president of the Miner Rubber Co., Ltd., Granby, P. Q., and of the Canadian Manufacturers' Association, has been successfully exhibiting his prize Jersey herd at the various Quebec Fall Fairs this year. At the recent Sherbrooke Winter Fair, his bull "Lynns' Nobly Cid" won the Senior Championship; his "Dorcas May Lad" won the Junior Championship; and his herd was also awarded the Senior and Junior Championships for cows. Mr. Miner is a particularly enthusiastic Jersey breeder and has for some years been gradually adding to his prize herd at "Pine Tree" farm in Granby.

Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., after three months on short time will resume full time operations at its plants because of fall bookings of orders.

Royal Oak Tire Corp., Oakville, Ont. Reopening its tire factory and the possible employment of a large number of men are being delayed only by lack of power and water on account of a $900 liability incurred by the defunct Royal Oak firm for a minimum service rate over a considerable period after the plant had closed down, was brought out at the Oakville council meeting. The plant is said to represent an investment of over $200,000, and at capacity employed 120 men. It has now been lying idle for about 5 years. In addition to tires a variety of other rubber products will be manufactured.

Seiberling Rubber Co. of Canada, Ltd., Toronto, Ont., has appointed J. B. Lee in charge of sales in British Columbia with headquarters at 518 Beatty St., Vancouver. Mr. Lee has been engaged for the past 12 years in the tire and automobile industry in eastern Canada. He succeeds Mr. Tracy, who returned to Australia.

Eastern Motors, Ltd., Sydney, N. S., has added the sales and servicing of Gutta Percha tires and Prest-O-Lite and Hart batteries to other lines of its business.

Foreign Trade Circulars

Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

Number	Special Circulars
3112	British footwear exports, August, 1931.
3114	Seventh report on native rubber cultivation.
3115	Net imports of crude rubber into manufacturing countries.
3126	Canadian tire exports, September, 1931.
3128	Canadian tire exports, first 9 months, 1931.
3129	Canadian footwear exports, first 9 months, 1931.
3130	Canadian exports of rubber and hose, first half, 1931.
3131	British footwear exports, September and first 9 months, 1931.
3132	British automobile casing exports, September and first 9 months, 1931.
3134	Market for sponge rubber products in West Indies.
3135	German tire exports, first 9 months, 1931.
3136	Possible use of pneumatic tire cars on French railways.
3138	International congress for the development of applications of rubber, held in Paris.
3141	French tire exports, September and first 9 months, 1931.
3142	French footwear exports, first 9 months, 1931.
3143	Japanese exports of tires, first 8 months, 1931.
3144	Belgian tire exports, August, 1931.
3145	Dealers' stocks of tennis shoes in the United States, November 1, 1931.
3146	Crude rubber reexports from United States, October, 1931.
3147	International trade in rubber latex.
3148	Comparative exports of boots and shoes from United States, Canada, and United Kingdom, first 9 months, 1931.
3150	Comparative tire exports from the United States, Canada, United Kingdom, and France, first 9 months, 1931.
3151	Canadian tire exports, October, 1931.
3154	British footwear exports, October, 1931.
3155	British exports of automobile casings, October, 1931.
3157	German tire exports, October, 1931.
3158	Japanese footwear exports, first 9 months, 1931.
3159	Belgian tire exports, September and first 9 months, 1931.

Rubber Industry in Europe

GREAT BRITAIN

Rationalization of the Rubber Industry

Foreign competition is very keen in general rubber goods, which, unlike tires, have no protective import tariff. Because of this special vulnerability of the rubber industry in Great Britain, rationalization is particularly necessary, urges a writer in *The India Rubber Journal*. The most general and best suited method of rationalization for the rubber industry in England, he states, is that by which a holding company with a controlling board of directors guides the activities of a group regarded as one producing unit, of which the constituent factories are organized in the most economical way.

After he lists the benefits of concentration of manufacture, he enumerates the dangers connected with pooling financial resources, central purchasing, over-capitalization, the temptation to extravagant expenditure, and, most important of all, weak management. With reference to the last, the writer remarks that there is no reason why the rubber industry can not supply super-efficient and far-sighted management.

One might remark that the writer himself has, to a certain extent, pronounced sentence on rationalization when he states: "The stimulus of competition has brought out many outstanding men in the industry, and should this competition impel the industry to rationalization, there is no reason to suppose that the men who have been hitherto successful in competition would not be equally successful in cooperation."

New Dunlop Tire

A new design of pneumatic tire has been patented by the Dunlop Rubber Co., Ltd., and W. H. Paull. The tread is flat and comparatively inextensible by means of layers of continuous cords or wires; while the sidewalls, rather thin and flexible, have a continuous curve which first extends outward from the side of the tread and then turns inward, forming a concave and flexible rim cushioning portion. This takes up from tread and sidewalls the shocks due to obstacles and the deformations due to variations in live load. The tire may be divided at the base and provided with inextensible beads for attaching to the rim or it may be of tubular form, provided with an inner tube and attached mechanically to the rim as usual.

Because of the shape of the tire, deflection under load or shock does not produce acute bending of the tire walls, but causes an eccentrical displacement of the inner periphery of the tire with little or no effect on the curvature of the sidewall.

The new shape and the method of construction of the tire, it is claimed, eliminate the self-destructive movement within the tread, make it less liable to puncture, and help to prolong considerably the usefulness of the molded antiskid design on the tread.

British Notes

There are now 11 demonstration areas of the various types of rubber roadways that have been experimented with, covering a total surface of 4,200 sq. yds., in London, Edinburgh, Glasgow, Newcastle, Bristol, Rotterdam, Paris, and Singapore. The section in New Bridge St., London, is exposed to traffic conditions among the heaviest in Great Britain. A census shows 17,623 vehicles, or 51,000 tons, passing there from 8 a.m. to 8 p.m., averaging 280 tons per yd. width per hr.; night traffic is not included.

Albert Healey, technical manager at Ft. Dunlop since 1927, has been appointed works manager at Birmingham and given a seat on the local board. He succeeds J. L. Collyer, who took over the position temporarily and has now joined the Dunlop headquarters staff in London. Mr. Healey has done important research work both at home and abroad for the past 16 years, and has read a number of papers before the Institution of Automobile Engineers.

A latex-bitumen compound, known as Cretex, for waterproofing roofs, damp walls, and foundations, recently has been on view at the Public Works Exhibition, London. The product may be used for joining glass surfaces also, and when thinned with water, serves as a rubber paint.

Another exhibit was a motor lorry with a movable floor for loading and unloading, which has been adopted by 2 railway companies, the Cement Marketing Co., and others. It is also included in the standard Ford commercial vehicles.

The St. Helens Cable & Rubber Co., Ltd., Slough, has put on the market 2 new types of acid-proof aprons for chemical workers. The one, of fabric impregnated with Cabtyrit quality compound, has a drip channel near the bottom to collect splashed liquids and drain them to the back to protect the wearer's legs and feet. The second type is of extra tough flexible rubber, also of Cabtyrit, cut to fit close to the body and reenforced where necessary with strong proofed canvas.

Wickham Memorial Bust

A fine marble bust, by Allan Wyon, of the late Sir Henry Wickham, subscribed for by members of the Rubber Growers' Association and presented to the Royal Empire Society, London, was unveiled before a large gathering of rubber men by Sir Herbert Wright, R. G. A. chairman, in the Smoking Room of the society on November 13, 1931. A bronze copy has been placed in the R. G. A. Council Room.

Institution of the Rubber Industry

G. Bruni, of the Pirelli Co., Milan, Italy, read a paper on the direct use of latex in manufacturing rubber articles, at a well-attended meeting of the London Section of the I. R. I. on November 11, 1931. D. F. Twiss presided. The various processes for obtaining condensed latex, preparations of latex mixes, artificial latices, aqueous dispersions of reclaimed rubber, all received due treatment.

Discussing the question of filtration of latex, Professor Bruni described a process used at the Pirelli factory in which latex was passed through porous porcelain tubes without clogging; while the tubes required only occasional washing with ammonia.

Footwear Marking Order

The Standing Committee under the Merchandise Marks Act which recently inquired into the application that imported rubber footwear be marked with the country of origin, recommends that an Order in Council be made. Such footwear would be boots, shoes, and slippers of all kinds, of rubber or with rubber soles, including overshoes with or without heels, and including footholds, but not canvas rubber-soled footwear where soles are stitched to the uppers. The goods are to be marked not only on sale but also on importation, the indication of origin to be applied to each boot, shoe, slipper, or foothold, by conspicuous letters in relief impressed prior to vulcanization, as follows:

All classes of goods except rubber boots. On shank, heel, or rubber label cemented to the shank before vulcanization.

Rubber boots. On shank, heel, near the top of the boot, on the outside, or on a rubber label cemented before vulcanization to the shank or near the top of the boot on the outside.

CZECHOSLOVAKIA

Some time ago it was reported that the well-known Czechoslovakian footwear manufacturer, Bata, had acquired an extensive factory site in Upper Silesia with the intention of producing footwear including those of rubber. It is now learned that a rubber shoe factory has been completed in Ottmuth (Upper Silesia) and that operations started there in November, 1931.

On top of this news comes the rumor that Bata is planning to establish a rubber goods factory in Switzerland.

Czechoslovakian tire manufacturers and importers as of October 1, 1931, increased the price of pneumatic tires by about 10 per cent.

GERMANY

Tires and Price-Fixing

Since the beginning of 1931 no agreement concerning prices to dealers has existed among tire manufacturers so that undercutting of prices, that bane of the German rubber industry, in holding full sway, has led to a most unfavorable trend in the tire market. Manufacturers recently gathered in Berlin to discuss putting the tire business on a sound basis again. The intention is to have all firms agree on equal terms for dealers. Thus the under-selling evil would be curbed, while a general price cut to consumers apparently could be made possible by the consequent reduction in the gross price. Price-fixing policies of individual firms will not be interfered with, since a tire cartel is not planned.

Incidentally exports of cycle tires of late considerably increased because of the sudden and extensive rise in shipments to Great Britain and the Netherlands East Indies. During the first 9 months of 1931, 736,293 tires were sent to Great Britain, against 453,741 during the corresponding period of 1930, while exports to the Netherlands East Indies, apparently so negligible in 1930 that they were not separately mentioned, came to 122,933 in 1931.

Anti-Skid Devices

The *Gummi-Zeitung* reports an anti-skid protection for tires recently patented in Germany by a resident of Kassel. The device not only prevents slipping on smooth surfaces in wet weather, but gives rapid and safe braking. Tests so far are reported to have been satisfactory, and further developments are eagerly awaited.

The *Gummi-Zeitung* also contains the suggestion that to prevent slipping, suitable substances in grain form might be incorporated in the tread compound. These substances should not injure the rubber, but, at the same time, should be so loosely combined with the soft rubber basis that they would be thrown out continually by centrifugal force, thus forming depressions on the surface of the tire to produce a rough tread. This rough surface would be constantly renewed as the wear on the tread would always be exposing and liberating new grains. Hard rubber grains or neutral harmless salts are suggested.

Such tires would have less resistance than those now used, but this condition would be equalized by the total elimination of tread profiles and the greater surface in contact with the ground connected therewith. The decrease in costs of manufacture and upkeep of molds would be considerable, so that the price of tires to consumers would be much lower.

Notes

Germany no longer depends upon foreign countries, particularly America, for modern machinery for tires and other rubber goods, it is claimed. German machinery manufacturers can supply all models of the most up-to-date designs for the rubber industry, at prices generally lower than those of foreign firms and more suited to the special manufacturing conditions here.

The National Bureau of Statistics here is analyzing and explaining the ownership in German stock companies. In spite of all efforts, however, it was impossible to collect complete data so that the figures actually collected and published represent the lower limits of the total participation.

There were at the end of 1930 in all 47 stock companies in the rubber and asbestos industry having a total capitalization of 104,000,000 marks. Of this, 5.9 per cent, or 6,190,000 marks, was in the hands of 7 foreign holders who had interests in 5 different companies. These 7 included 4 trading and producing companies, branches of foreign firms. According to domicile of the investors, 4,500,000 marks were held in England, 250,000 in Liechtenstein, 60,000 in Austria, 750,000 in other European states, and 630,000 in the United States.

SOVIET RUSSIA

Rubber Industry Progress

Crude rubber imports by Soviet Russia as officially reported were 12,827 metric tons in 1929, 16,408 in 1930, and 9,272 metric tons during the first half of 1931. For the year ended September 30, 1924, the figure had been 2,346 tons.

Available figures for exports of manufactured rubber do not go back further than the year ended September 30, 1926. In that year exports of the most important article, galoshes, came to 141 metric tons, value, 646,000 rubles; 210 tons, value, 811,000 rubles, in 1926-27; 1,513 tons, value, 5,491,000 rubles, in 1927-28; 3,774 tons, value 9,593,000 rubles, in 1928-29; 2,653 tons, value, 6,167,000 rubles, 1929-30. Tire exports, which were first officially reported in 1928-29 at 437 metric tons, rose to 603 tons in 1929-30. In addition other rubber goods totaling 64 metric tons were exported in 1928-29, and 76 tons in 1929-30.

Russian Goods at Vienna

At the Vienna Fall Fair for 1931 Soviet Russia had a special pavilion where a variety of rubber goods were shown including several styles of snowboots, the tops varnished and decorated with stripes and wavy lines or trimmed with velvet. Women's rubber shoes, some fur-lined, were exhibited in several colors; besides these appeared a variety of sponges toys, surgical, sporting, and technical goods, tires, tobacco pouches, etc. Orders were booked mainly from buyers from Sweden, Hungary, and the Balkan States, chiefly for galoshes, pneumatic tires, and hot water bottles.

AUSTRIA

Dumping Charges

The Wimpassing works, the chief local supplier of galoshes, is being hard hit by Soviet dumping of footwear. Prices are reported to be 30 to 40 per cent below those of other foreign shippers. That these charges are not baseless appears evident from Austrian import statistics which, for instance, show the entry of 716 quintals of Treugolnik footwear, value, 498,000 schilling, as compared with 675 quintals of Tretorn shoes, value, 911,000 schilling. In fact Russia ranks second as supplier when quantity is considered (Poland is first), but only fifth as regards value.

New Inner Tube

Press reports state that Karl Thumser, of Vienna, has constructed a new tire having an inner tube divided longitudinally into 2 chambers by a partition. As in other multi-chambered inner tubes, when one of the chambers is damaged, the air streams out and the pressure from the second chamber squeezes the movable partition against the hurt wall, thus effectually sealing the puncture. The partition, not being under tension, cannot be pierced by nails. In a test, Thumser succeeded in covering almost 400 kilometers with a defective inner tube front and back; the cover remained intact.

FRANCE

The chief centers for manufacturing elastic fabrics, an important item in France, are St. Etienne, Romilly-sur-Seine, St. Chamond, Rouen, and the vicinity of Paris. It is estimated that the annual output represents a value of roughly $6,000,000 to $8,000,000. Of late, owing to bad business conditions, the output has fallen markedly; this decline is also reflected in the exports which, after rising from 1,439 quintals in 1913 to 1,819 in 1928 and 2,448 in 1929, fell in 1930 to 2,050 quintals; while for the first half of 1931, they were only 872 quintals. Great efforts are being made to create new designs to stimulate demand. The chief buyers of these French goods are Belgium, England, and the United States. Imports of elastic fabrics into France have declined from 905 quintals in 1913 to 146 in 1928 and 152 in 1930.

The Societe Electro-Cable and its 4 subsidiaries are in the hands of liquidators, *The India Rubber Journal* learns. The concern, which had a capital of 125,000,000 francs, failed chiefly because of a too rapid expansion policy. In addition to manufacturing insulated wires and cables, etc., the firm had recently taken up producing floor coverings on a large scale. Negotiations with the French banks for a reconstruction came to naught because of the company's unsatisfactory financial position, as did those with the American Anaconda copper group. No estimate of the losses is as yet available.

SWEDEN

While the business reports of 3 leading Swedish rubber manufacturers show considerably decreased profits for 2, the fact that they were able to book profits at all seems to indicate that they are managing to hold up their end pretty well. The Helsingborgs Gummifabriks A. B., Helsingborg, manufacturer of rubber footwear, reported profits of 473,000 kroner against

(*Continued on page* 82)

Rubber Industry in Far East

NETHERLANDS EAST INDIES

Planting Statistics

As usual, the Bulletin of the Central Bureau of Statistics contains much interesting data on the 1930 export crops of the Netherlands East Indies. That year 1,100 rubber estates totaled 1,701,498 hectares of which 547, covering 686,194 hectares, were in Java, and 553, with 1,015,304 hectares, in the Outer Provinces, including Sumatra. Since the planted areas totaled 687,237 hectares, or 40.4 per cent of the total acreage (318,445 hectares in Java and 368,792 in the Outer Provinces), it is clear that ample reserve lands are available. This fact is especially true in Sumatra where the percentage of planted to total acreage is only 37.3.

Out of the 1,100 estates mentioned, however, only 620, with planted acreage totaling 390,653 hectares, produced rubber exclusively; the rest either planted other crops also on separate sections (those devoted to Hevea in this case covering 128,661 hectares), or had these crops, chiefly tea, coffee, and cinchona, interplanted with the rubber (on 53,700 hectares); therefore the actual total area under rubber was only 573,014 hectares. It may be mentioned that this practice of interplanting other crops with rubber is tending to decrease more and more; at present most of the mixed areas are in East Java where there are only 27,784 hectares out of a total 82,705 on which rubber is planted unmixed.

Hevea in bearing covered 369,250 hectares in 1930, and of this 27,440 hectares were interplanted with other crops, chiefly coffee.

Extensions were more considerable in 1930 than in 1929; the net total increase was 25,458 hectares against 21,910 in 1929; but they show a marked decline when compared with the extensions in 1926, 1927, and 1928, the figures for these years having been 30,939, 39,586, and 40,173 hectares respectively. The net expansion is arrived at after due allowance is made for areas abandoned and for corrections in figures previously given. While the greater part of the new planting took place in Sumatra, it is significant that the abandoned areas there and in the Outer Provinces increased, from 255 to 951 hectares for East Coast Sumatra alone, and from 857 to 2,096 hectares for the entire Outer Provinces. The areas abandoned in Java, though still high, declined somewhat, from 4,455 to 4,326 hectares.

Estate outputs in 1930 were 153,531 tons against 154,154 in 1929, and native exports were 90,496 against 108,584 tons in 1929. In all, production was 244,026 against 262,738 tons. The average yield per hectare on estates not having mixed plantings was 414 kilos against 427 for all Netherlands East Indies. For Java the figures were 423 and 437 kilos respectively, and for the Outer Provinces 410 and 423 kilos respectively. The reduction in yield per unit of area was caused chiefly by the cessation of tapping in May, 1930. In addition data have been obtained from 14 estates, with a combined productive area of 1,996 hectares, where tapping was stopped in the course of the year; while 21 small estates with a total mature area of only 323 hectares stopped tapping the whole of 1930.

Latex Shipments

Shipments of latex from East Coast of Sumatra increased during 1930 from 3,590 metric tons in 1929 to 7,325 in 1930. Java showed a decline from 470 to 402; while from the Lampong Districts came only 18 against 26 tons. The total dry rubber equivalent from all 3 sources was 2,582 metric tons, which are included in the figures for estate outputs of rubber.

The exports of sprayed rubber from Sumatra fell from 14,850,674 kilos in 1929 to 7,928,736 kilos in 1930, while those from Java rose from 4,001,280 to 4,248,006 kilos.

AUSTRALIA

The report of the past business year of the Dunlop-Perdriau Rubber Co., Ltd., and Barnet Glass, shows a very substantial decline in profits and, consequently, in dividends. Net profits of the combine in 1931 came to £195,327 against £366,179 in 1930 and £622,568 in 1929. Since the minimum 8 per cent, or £16,000, on the Barnet Glass preferred and 10 per cent, or £93,000, on the Dunlop-Perdriau preferred have to be deducted, the profits on the common stock of £3,765,655, totaled only £86,327 for 1931, that is 2.3 per cent, as compared with earnings of 6.8 per cent in 1930 and 13.6 per cent in 1929. The 1931 ordinary profits were not even sufficient to cover the 2½ per cent dividend that was declared (against 6 per cent in 1930 and 10 per cent in 1929), which required £94,141.

The financial report of the Rapson Tire & Rubber Co., Ltd., which is in liquidation, shows a small profit for the 10 months reviewed, and prospects are considered very satisfactory. A distribution of 2s. on the £ to creditors is in view, and there is a likelihood that shareholders may eventually receive 20s. on the £. In view of this favorable situation the liquidator and the committees of inspection will be permitted to continue manufacturing, as before, for another 12 months.

Retreaders' Supplies, Ltd., is a new company, registered in Sydney with a capital of £5,000, to manufacture and deal in rubber goods and general merchandise.

Golf balls are now to be manufactured in Australia by A. G. Spalding at its sporting goods factory at Sunshine. Up to the present imported goods covered all needs.

New Paving Material

According to reports from Batavia, the Bataafsche Petroleum Mij. has obtained a patent for a new method of improving and hardening roads. A mixture of colas —cold asphalt—and latex is used, the compound being put on the market under the name Colastex. The amount of latex is only 10 per cent, but it is claimed that the product gives much more durable roads than when colas alone is used. For one thing, Colastex roads are less sensitive to the oil dripping from automobiles; then it has a higher melting point than asphalt alone, while penetration and extensibility remain unchanged; this condition is a distinct advantage with the high temperatures in the tropics. Colastex is produced at Wonokromo, near Soerabaia.

As might have been expected, planters are showing great interest in this new surfacing material which was used on a demonstration area in the Government Botanical Gardens at Buitenzorg.

Cessation of Tapping

It is officially shown that during 1931, 13 estates stopped tapping altogether; while 114 estates temporarily interrupted tapping. This action means that the 1931 rubber output is 6,187 tons below that for 1930. It should be noted that estates which partly stopped tapping, on special areas, are not included in the above.

Firestone in Batavia

Local press announcements show that the Firestone Tire & Rubber Co. for Netherlands East Indies, has been established at Batavia, with a capital of 100,000 guilders, in 100 shares of 1,000 guilders each. The new company will deal in tires, tubes, accessories, repair tires, automobiles, etc.

Agricultural Syndicate

As the income of the General Agricultural Syndicate of Java is expected to show a decrease of at least 150,000 guilders for 1932, because of the large number of members who have resigned owing to the depression in the planting industries here, a strict policy of economy has been decided upon. Salaries will be cut 10 per cent. Three vacancies on the scientific staff are not to be filled, and the following have been honorably discharged: Dr. Ultee (by request), who severs his connection at the end of 1932; Dr. Bally, after August 31, 1932; Mr. Keuchenius, on May 1, 1932; Dr. Riebl, as of December, 1931; Dr. Bobilioff (on request) joined the A. V. R. O. S. Rubber Experiment Station in Sumatra on December 31, 1931, and 3 others. The official organ of the syndicate, "De Bergcultures," will have fewer paid contributions.

MALAYA

Manuring Hevea

For several years past numerous manurial experiments have been carried out on estates in Malaya, Sumatra, and Java. A résumé of results obtained so far is published by Drs. Haines and Flint, of the Soils Division of the Institute, in the October issue of the *Journal of the Research Institute of Malaya.*

Leaving out of consideration the remark that under present price conditions manuring is not an economical proposition, it may be stated that in general areas yielding 400 lbs. per acre do not usually respond to manuring, but those with yields of under 300 lbs. may be expected to show satisfactory results. Fairly old trees of good appearance and growth, but poor yield, appear to respond most readily to manuring; while those having sparse, poorly-colored foliage improve in appearance after manuring; but as their bark is usually thin, hard, and dry, it takes much longer before improvement in yields is noted.

However, trees stunted from earliest growth on poor soil, although having sparse foliage and hard bark, often respond more rapidly to fertilizers than good trees that have deteriorated, for they may be hardier and of more conservative metabolism.

It must be clearly understood that what manuring effects in respect to output is to help raise the yield level of an area to approach the potential yield level so that if the yields, by popular standards, are at a low level, they will improve by manuring; but if the level is near the full potential capacity of the trees, fertilizers can make little difference in the outputs.

This condition is also true for buddings. According to earlier standards the yield of a certain budded area may be considered high, but the output might actually be so far below the full capacity of the trees that a striking response to manuring could reasonably be expected so that fertilizers used on high yielding areas may prove a far greater economic success than is the case with the present mixed populations of mature trees. Apart from this condition, of course, budded trees would require more manuring because they take more from the soil than do ordinary trees.

Incidentally, it is pointed out, that in selecting possible mother trees for budding, the actual yield of individual trees are not considered by the Botanical Division of the Rubber Research Institute, but the yield as compared with the average yield of the surrounding area.

Ideas of soil management are changing and, where fertilizing is used as a remedy for past mistakes of management, it will pass. In the future the aim of fertilizing will most likely be (for good soils) to force increased latex secretion, and chemical stimulants will be used having a selective action on desirable soil organisms.

With regard to the nitrogen supply of the soil, planting practice will probably be along forestry lines in which natural cover crops carefully selected for specific purposes will be used. The pioneer work in this direction has already proved successful.

Shipping Rates

Quite a flurry of excitement occurred in Singapore when it became known that the large firm of rubber exporters, Barbour & Co., had chartered the *S.S. Siljestad,* to carry 6,500 tons of rubber to the United States at $5.50 instead of $11.50, the rate of the Shipping Conference. (United States currency.)

This difference in freight rates reduces the price of rubber ¼-cent (United States currency) per lb., which in these days of figuring rises and falls in rubber prices by eighths and sixteenths of a cent, is of considerable importance to the rubber producer. In fact, to a good many, this ¼-cent off costs is enough to decide whether they are to lose or break even on their shipment.

It was not expected, of course, that the Shipping Conference would not take action, so soon came the news that it also would reduce rates from $11.50 to $5.50. These new prices, however, would be effective only until 24 hours after the *Siljestad* departed from Malayan waters; while shippers to benefit by them would have to sign an agreement to ship by Conference boats only. Those who did not do so, it was announced, would have to pay $13.50 when the rates were again raised to $11.50.

However indignant individual exporters may be over this proposed action of the Shipping Conference, they are not saying much in public about the matter. But the local press is doing all the criticizing. The *Straits Times* adequately reflects the local attitude when it remarks in an editorial, "The Bludgeon": "Shorn of its trimmings the Conference ultimatum to shippers is this: 'We forbid you to accept the offer of Barbour & Co., Ltd. If you ignore this command you will, whenever you wish to ship rubber by a Conference steamer in future, be penalized to the extent of $2 per ton. You will enter into a contract with a Conference line forthwith and we will accept your goods at the rate quoted by the pirate company. That will last only until we have broken the opposition and we are using you to achieve that end as speedily as possible. Afterwards you go back on to the old rate. The reward for your refusal to support this opposition scheme will be our abstention from charging you $13.50 as against the old rate of $11.50 and the Barbour rate.' For sheer bullying that would be hard to beat. The tragedy of it is that the Conference is strong enough to carry out its threat in the absence of any concerted action or Government intervention to free the trade of the country from a burden which is slowly but surely killing it."

That the paper in question believes that exporters have a remedy if they seriously wish to use it is seen in the concluding lines of the editorial: "A combination of exporters chartering systematically would call the bluff of the Conference. And what a bluff it is!"

Later reports show that the argument now centers about who will actually benefit by the reduced freight rates. Mr. Barbour asserts that merchants buying rubber will not get the advantage but the Malayan producers will; while H. M. Hawkeswood, chairman of the Singapore Chambers of Commerce Rubber Association, emphatically states that the primary producer would not gain a permanent advantage through freight reduction, especially on a falling market. Even if it were assumed that the producer would so benefit, the immediate result would be that many poor producing companies, who ought to be out of existence at present, would stay in to increase still further rubber production, making the position of rubber worse than it already is.

U. S. LATEX IMPORTS

United States imports of latex seem likely to make a new high record in 1931, following the preceding record set in 1930. There is thus some evidence of steadily increasing use of latex even during this depression period. The unit value per pound of dry rubber content is usually higher than for rubber imported in sheet form, partly because latex commands a premium as a special product and partly because transportation charges are higher for latex than for dry rubber in cases.

The Osaka Industrial Research Institute of Japan has not developed a new soling adhesive as reported in these columns. The technical method of attaching the rubber sole by an adhesive to the canvas shoe with "tape" between has, however, been greatly improved. The consistency of the adhesive varies with special requirements, but a naphtha cement solution is generally used.

SWEDEN

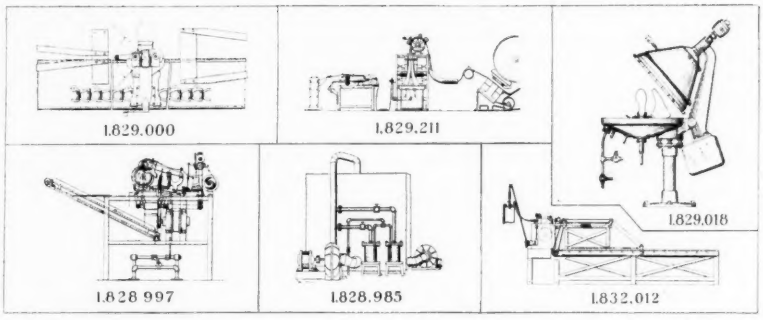
(*Continued from page* 80)

2,040,000 the year before, and had to reduce its dividend from 12 to 7 per cent. The Ryska Gummifabriks A. B., Malmo, also produces rubber footwear. It showed profits of 293,000 against 574,000 kroner; the dividend was 10 instead of 12 per cent. The Skandinaviska Gummi A. B., Viskafors, the smallest of the 3 concerns, was the only one to increase its profits, from 203,000 to 256,000 kroner; while its dividend has been raised from 6 to 12 per cent. Possibly the fact that this firm produces footwear not only as do the other 2 firms, but also mats, gloves, and mechanical goods, may have something to do with the increased profits.

ITALY

A new type of diving tower in which a man can go down 2,000 feet under the sea, is reported to have been invented by Signor Giovanni Galeazzi, Spezia, Italy. This tower, equipped with a telephone, is of light sheet steel while the inside of the walls are covered with rubber.

Patents, Trade Marks, Designs



Machinery

United States

1,828,985.* **Rubber Surface Finisher.** An apparatus is provided within which varnished rubber footwear may be exposed to the vapors of various volatile chemical substances; the effect of which is to render the surface finish of the goods firm and dry. This treatment is applied to the articles immediately after their vulcanization as a preparation for the packing operation. S. D. Shinkle, assignor to L. Candee & Co., both of New Haven, Conn.

1,828,997.* **Seam Reenforcer.** This power driven and largely automatic machine is designed for applying a surface or reenforcing strip of rubber to the cut-together seams of sheet rubber articles such as bathing caps. The applying means operate intermittently or in distinct cycles, automatically delivering the cap at the end of each cycle and pausing long enough to permit the insertion of a new cap. A. E. Collins, Cuyahoga Falls, O., assignor, by mesne assignments, to Miller Rubber Co., Inc., Wilmington, Del.

1,829,000.* **Lasting Jack Positioner.** This apparatus serves to position a shoe lasting jack and operates in connection with an endless conveyer mechanism to support a shoe last so that the last and the shoe under construction will be delivered to the various operatives in the most convenient working position. E. E. Foster, Beverly, Mass., assignor, by mesne assignments, to Hood Rubber Co., Inc., Wilmington, Del.

1,829,018.* **Shoe Vulcanizing Machine.** A special advantage of this vulcanizer is that it provides a means for shortening the cure of rubber footwear and effects a rapid turnover of the lasts on which the footwear is cured. It accommodates about 6 or 8 articles, and a series of these vulcanizers can be attended by one operator. J. W. Schade, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,829,211.* **Bathing Cap Machine.** Bathing caps having thicker or stronger margins or head band portions are rapidly and economically manufactured on this machine. When so made, the caps may be provided with metal head or body bands applied by the machine. A. E. Collins, Cuyahoga Falls, O., assignor, by mesne assignments, to Miller Rubber Co., Inc., Wilmington, Del.

1,832,012.* **Thread Making Machine.** An apparatus is devised for manufacturing tubing, thread, or other articles by extruding a rubber dispersion into a coagulant. Latex or other dispersions of rubber with or without compounding and vulcanizing ingredients is extruded at a predetermined rate of speed through a nozzle into a body of coagulant. W. A. Gibbons, Great Neck, and E. Hazell, assignors to General Rubber Co., both of New York, all in N. Y.

1,829,041. **Tire Bead Coverer.** F. D. Fowler, Newton, Mass., assignor, by mesne assignments, to Hood Rubber Co., Inc., Wilmington, Del.

1,829,221. **Shoe Sole Press.** C. L. Huntoon, Los Angeles, Calif.

1,829,778. **Vulcanizer.** J. W. Barton, assignor to Barton Packer Co., both of Flint, Mich.

1,830,114. **Shoe Cementing Machine.** F. D. Kinney, Wenham, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.

1,830,676. **Cushion Tire Mold.** I. J. Remark, assignor to General Tire & Rubber Co., both of Akron, O.

1,831,288. **Tire Mold.** A. G. Cole, Lewistown, and H. B. Cochran, Reedsville, assignors to Standard Steel Works Co., Philadelphia, Pa.

1,831,333. **Glove Manufacturing Device.** P. H. Watkins, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,831,500. **Latex Separator.** H. O. Lindgren, Appelviken, Sweden, assignor to De Laval Separator Co., New York, N. Y.

1,831,525. **Shoe Pressing Machine.** E. E. Clements, assignor to L. Candee & Co., both of New Haven, Conn.

1,831,543. **Toe Cementing Machine.** H. R. Polleys, New Haven, Conn., assignor to National India Rubber Co., Bristol, R. I.

1,832,478. **Tire Former and Chuck.** C. H. Desautels, Springfield, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,832,479. **Tire Balancing Mechanism.** L. H. Eakins, assignor to Fisk Rubber Co., both of Chicopee Falls, Mass.

1,832,489. **Tire Former and Chuck.** P. W. Lehman, Milwaukee, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.

1,832,823. **Flexible Material Conveyer.** C. C. Van Arsdale, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,832,826. **Manometer.** W. B. Weyrick, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

Dominion of Canada

316,455. **Collapsible Tire Building Form.** F. L. Johnson, Akron, O., U. S. A.

316,533. **Mold Handling Device.** Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., assignee of H. D. Stevens, Akron, O., and N. H. Meyers, Los Angeles, Calif., co-inventors, both in the U. S. A.

316,653. **Printing Plate Mold.** J. Schmutz, Louisville, Ky., U. S. A.

316,751. **Bead Gum Strip Applier.** Goodyear Tire & Rubber Co., assignee of J. A. Shively, both of Akron, O., U. S. A.

316,794. **Tire Deflating Machine.** A. Schrader's Son, Inc., assignee of J. Wahl, both of New York, N. Y., U. S. A.

317,032. **Conveyer System.** Kaufman Rubber Co., Ltd., assignee of J. G. Rempel and C. A. Schippling, co-inventors, all of Kitchener, Ont.

317,161. **Golf Ball Marker.** C. R. Long, Smethport, Pa., U. S. A.

United Kingdom

353,693. **Physical Testing Machine.** A. E. White, London. (B. F. Goodrich Co., New York, N. Y., U. S. A.)

353,911. **Extrusion Machine.** Electrical Research Products, Inc., New York, N. Y., assignee of T. K. Cox, Chicago, Ill., both in the U. S. A.

354,554. **Tube Vulcanizing Mold.** W. L. Fairchild, New York, N. Y., U. S. A.

354,770. **Tire Mold.** Bakelite Corp., New York, N. Y., assignee of G. W. Crosby, Woodcliff, N. J., both in the U. S. A.

354,862. **Seamed Goods Mold.** Dunlop Rubber Co., Ltd., London, and F. W. Warren, Manchester.

354,988. **Mold Opening Apparatus.** Firestone Tyre & Rubber Co., Ltd., Middlesex. (Firestone Tire & Rubber Co., Akron, O., U. S. A.)

355,565. **Footwear Mold.** H. C. L. Dunker, Helsingborg, Sweden.

355,679. **Tire Vulcanizer Automatic Timer.** C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., U. S. A.

355,789. **Hollow Toy Mold.** Radium-Gummiwerke, Cologne, Germany.

Germany

537,679. **Shoe Repair Vulcanizer.** Schuhmaschinenfabrik Fulda G. m. b. H., Fulda.

538,030. **Edge Rolling Machine.** Carl

* Pictured in group illustration.

J. Schmid, Inc., New York, N. Y., U. S. A. Represented by B. Kugelmann, Berlin S.W. 11.

538,582. **Insulating Material Mold.** H. Rommler A. G., Spremberg i. d. N. L.

539,024. **Calender.** Goodyear's India Rubber Glove Mfg. Co., Naugatuck, Conn., U. S. A. Represented by W. Karstens and C. Wiegand, both of Berlin S. W. 61.

Designs

1,190,958. **Rubber Sheets.** Hermann Berstorff Maschinenbau - Anstalt G. m. b. H., Hannover.

1,190,961. **Vulcanizer.** Hermann Berstorff Maschinenbau-Anstalt G. m. b. H., Hannover.

1,191,031. **Vulcanizer.** Siemens-Schuckertwerke A. G., Berlin-Siemensstadt.

1,192,570. **Mandrel.** Siemens-Schuckertwerke A. G., Berlin-Siemensstadt.

1,192,571. **Mold Closure.** Siemens-Schuckertwerke A. G., Berlin-Siemensstadt.

1,192,572. **Vulcanizer Closure.** Siemens-Schuckertwerke A. G., Berlin-Siemensstadt.

1,192,729. **Container Closure.** Harburger Gummiwaren - Fabrik Phoenix A. G., Harburg-Wilhelmsburg 1.

1,192,832. **Tire Kepair Device.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berlin S.W. 11.

1,192,927. **Vulcanizer.** Siemens-Schuckertwerke A. G., Berlin-Siemensstadt.

1,194,335. **Rubber - working Machine.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfurt a. M., and T. R. Koehnhorn, Berln, S.W. 11.

Process

United States

1,828,925. **Joints.** W. G. Christopherson, Grosse Pointe Park, assignor to Morgan & Wright, Detroit, both in Mich.

1,830,141. **Colored Vulcanized Slabs.** J. E. Stone, Providence, R. I.

1,830,428. **Insoles.** E. A. Ellis, Medford, assignor to Boston Blacking Co., Inc., Boston, both in Mass.

1,830,465. **Preventing Water Bag Deterioration.** E. T. Handley, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,831,689. **Shoe Stiffener. C. E. Swett,** assignor, by mesne assignments, to Beckwith Mfg. Co., both of Boston, Mass.

1,831,761. **Printing Cylinder Packing.** C. Winkler, Bern, Switzerland.

1,832,514. **Ornamenting Articles.** G. Thorne, Liverpool, England, assignor to Dunlop Rubber Co., Ltd., a corp. of Great Britain.

Dominion of Canada

316,591. **Electrical Insulating Material.** W. S. Smith, Newton Poppleford, Devonshire, H. J. Garnett, Sevenoaks, J. N. Dean, Orpington, both in Kent, B. J. Habgood, Bournemouth, and H. C. Channon, S. Kensington, London, co-inventors, all in England.

316,676. **Rubber Article.** Anode Rubber Co., Ltd., Guernsey, assignee of B. Dales, Springfield, Mass., U. S. A.

316,836. **Rubber Composit on.** Dunlop Rubber Co., Ltd., London, England, and Anode Rubber Co., Ltd., Guernsey, assignees of **W. H. Chapman and** D. W. Pounder, co-inventors, both of Birmingham, England.

316,992. **Processing Latex.** Brown Co., Berlin, N. H., assignee of R. F. Elder, Cambridge, and R. B. Hill, Peabody, co-inventors, both in Mass., all in the U. S. A.

317,013. **Applying Rubber to Metal.** Dayton Rubber Mfg. Co., assignee of J. Rockoff, Dayton, O., U. S. A.

United Kingdom

353,181. **Attaching Heels to Footwear.** W. J. Spicer, Birmingham.

353,437. **Electric Cable Jointing.** Electrical Research Products, Inc., New York, N. Y., assignee of F. S. Malm, Chicago, Ill., both in the U. S. A.

353,645. **Concrete Slab.** F. J. Kellow, Weston-super-Mare.

353,656. **Goods from Aqueous Dispersions.** Dunlop Rubber Co., Ltd., London; Anode Rubber Co., Ltd., St. Peter's Port, Guernsey; H. C. Young and C. Hemm, both of Manchester.

355,871. **Recovering Waste Rubber.** E. Wood, Surrey.

Germany

537,570. **Tires.** Goodyear Tire & Rubber Co., Akron, O., U. S. A. Represented by G. Lotterhos, Frankfurt a. M.

Chemical

United States

1,828,990. **Rubber Articles by Deposition.** P. H. Watkins, Leonia, and A. W. Holmberg, S. Orange, both in N. J., assignors to National India Rubber Co., Bristol, R. I.

1,829,029. **Chicle Substitute.** W. F. Zimmerli, Akron, and W. L. Semon, Cuyahoga Falls, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

1,829,209. **Insulation.** C. R. Boggs, Waban, assignor to Simplex Wire & Cable Co., Boston, both in Mass.

1,829,502. **Rubber-like Product.** W. S. Calcott and D. H. Powers, both of Penns Grove, and F. B. Downing, Carneys Point, all in N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

1,829,992. **Rubber Composition.** A. R. Kemp, Westwood, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

1,829,997 and 1,829,998. **Composition.** C. Martell, Cicero, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

1,830,749. **Age Resister.** W. S. Calcott and W. A. Douglass, both of Penns Grove, N. J., assignors to E. I. du Pont de Nemours & Co., Wilmington, Del.

1,831,226. **Bituminous Rubber Composition.** J. N. Byrd, Baltimore, Md.

1,831,492. **Concentrating Latex.** E. A. Hauser, Frankfort a. M., Germany.

1,831,538. **Molding Composition.** J. McGavack, Jackson Heights, N. Y., assignor to Naugatuck Chemical Co., Naugatuck, Conn.

1,831,544. **Colloidal Solution Preparation.** W. B. Pratt, Wellesley, and R. J. Noble, Malden, both in Mass., assignors, by direct and mesne assignments, to Dispersions Process, Inc., Dover, Del.

1,831,895. **Latex Composition.** W. B. Van Arsdel and R. B. Hill, assignors to Brown Co., all of Berlin, N. H.

1,831,932. **Accelerator.** G. H. Stevens, Newark, N. J.

1,832,163. **Accelerator.** G. S. Whitby, Montreal, P. Q., Canada, assignor, by mesne assignments, to Roessler & Hasslacher Chemical Co., New York, N. Y.

1,832,328. **Accelerator.** W. Scott, Nitro, W. Va., assignor to Rubber Service Laboratories Co., Akron, O.

1,832,415. **Accelerator.** C. O. North and C. W. Christensen, assignors to Rubber Service Laboratories Co., all of Akron, O.

Dominion of Canada

316,562. **Accelerator.** Rubber Service Laboratories Co., Akron, O., assignee of R. L. Sibley, Nitro, W. Va., both in the U. S. A.

316,563 and 316,564. **Age Resister.** Rubber Service Laboratories Co., Akron, O., assignee of W. Scott, Nitro, W. Va., both in the U. S. A.

316,749. **Antioxidant.** Goodyear Tire & Rubber Co., assignee of W. M. Lauter, both of Akron, O., U. S. A.

317,007. **Gas Electrode Batteries.** Canadian National Carbon Co., Ltd., Toronto, Ont., assignee of G. W. Heise, N. Olmsted, and E. A. Schumacher, Lakewood, co-inventors, both in O., U. S. A.

317,184. **Treating Latex.** F. H. Untiedt, Washington, D. C., U. S. A.

317,225. **Antioxidant.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. S. Calcott and W. A. Douglass, co-inventors, both of Penns Grove, N. J., U. S. A.

317,244. **Chemical Product.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. M. Cadwell, Leonia, N. J., U. S. A.

317,245 and 317,246. **Latex Rubber Articles.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. M. Cadwell, Leonia, N. J., U. S. A.

317,247. **Treating Rubber.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of H. E. Cude, S. Manchester, Conn., U. S. A.

317,248. **Treating Rubber-Fiber Waste.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of R. P. Rose, Jackson Heights, L. I., N. Y., U. S. A.

United Kingdom

353,518 and 353,519. **Gutta Percha Composition.** Electrical Research Products, Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, and J. H. Ingmanson, Bloomfield, both in N. J., all in the U. S. A.

353,692. **Preserving Rubber.** Imperial Chemical Industries, Ltd., London. (E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.)

353,895. **Rubber Dispersions.** Dunlop Rubber Co., Ltd., London, Anode Rubber Co., Ltd., St. Peter's Port, Guernsey, and A. S. King, Ft. Dunlop, Birmingham.

353,970. **Vulcanizing.** British Thomson-Houston Co., Ltd., London, assignee of B. W. Nordlander, Schenectady, N. Y., U. S. A.

354,185. **Attaching Rubber to Metal.** Electrical Research Products, Inc., New York, N. Y., assignee of E. G. Sturdevant, Chicago, Ill., both in the U. S. A.

354,310. **Molding Resins.** J. C. Patrick, Kansas City, Mo., U. S. A.

354,380. **Rubber Latex Treatment.** Electrical Research Products, Inc., New York, N. Y., assignee of A. R. Kemp, Westwood, N. J., both in the U. S. A.

354,760. **Rubber Compounding Ingredient.** J. Y. Johnson, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

354,769. **Coloring Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

354,819. **Rubber Sizing Solution.** J. M. Lyonnet, Lyons, France.

354,841. **Vulcanizing Rubber.** A. Carpmael, London. (I. G. Farbenindustrie A. G., Frankfort a. M., Germany.)

355,287. **Rubber.** Dunlop Rubber Co., Ltd., London, Anode Rubber Co., Ltd., Guernsey, D. F. Twiss and E. A. Murphy, both of Ft. Dunlop.

355,341. **Rubber Composition.** India Rubber, Gutta Percha & Telegraph Works Co., Ltd., London, and F. J. Crosley, Burton-on-Trent.

355,416. **Vulcanizing.** I. G. Farbenindustrie A. G., Frankfort a. M., Germany.

355,425. **Preserving Rubber.** Imperial Chemical Industries, Ltd., London. (E. I. du Pont de Nemours & Co., Wilmington, Del., U. S. A.)

355,547. **Coating Composition.** New York-Hamburger Gummi-Waaren Co., Hamburg, Germany.

355,945. **Rubber Composition.** Felten & Guilleaume Carlswerk A. G., Cologne, Germany.

356,041. **Gutta Percha and Balata Composition.** Felten & Guilleaume Carlswerk A. G., Cologne, Germany.

Germany

537,715. **Accelerating Vulcanization.** R. Englert and F. Becker, Chemische Fabrik, Prague, Czechoslovakia. Represented by F. Warschauer, Berlin S.W. 11.

537,808. **Rubber Articles.** Metallgesellschaft A. G., Frankfort a. M.

537,865. **Rubberlike Masses.** I. G. Farbenindustrie A. G., Frankfort a. M.

538,941. **Rubber Conversion Products.** B. F. Goodrich Co., New York, N. Y., U. S. A. Represented by G. Benjamin, Berlin-Charlottenburg.

538,942. **Antiager.** Naugatuck Chemical Co., Naugatuck, Conn., U. S. A. Represented by W. Karstens and C. Wiegand, both of Berlin S.W. 61.

539,366. **Improving Rubber Goods.** Technische Chemikalien Co. G. m. b. H., Halle a. d. S.

539,509. **Making Hard and Soft Rubber.** Technische Chemikalien Co. G. m. b. H., Halle a. d. S.

General

United States

18,237 (Reissue). **Cushioning Insole.** M. C. Messler, assignor to M. Messler, both of Providence, R. I.

1,828,804. **Mirror Bracket.** R. D. Horton, Gregory, S. D.

1,829,085. **Printing Plate.** H. Buschmann, Stettin, Germany.

1,829,157. **Composite Sheet Material.** G. A. Richter, assignor to Brown Co., both of Berlin, N. H.

1,829,206. **Stuffing Box.** G. F. Wilson, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,829,253. **Detachable Heel.** J. D. Zubia and M. S. Gutiérrez, both of Los Angeles, Calif.

1,829,287. **Cleaning Device.** D. M. Lovett, Trenton, N. J.

1,829,380. **Ball Marginal Reenforcement.** W. J. Voit, Los Angeles, Calif.

1,829,414. **Hot Water Bottle Thermometer.** H. D. Lapkin, San Francisco, Calif.

1,829,432. **Fastening Device.** T. B. Andre, London, England.

1,829,483. **Tire.** E. Hibbert, Goulburn, assignor to Pioneer Cell Tyre Co., Ltd., Sydney, both in N. S. W., Australia.

1,829,676. **Vehicle Engine Suspension.** F. H. Royce, W. Wittering, assignor to Rolls Royce, Ltd., Derby, both in England.

1,829,941. **Antislip Heel.** J. J. Murphy, Cincinnati, O.

1,830,117. **Motor Mounting.** R. K. Lee, assignor to Chrysler Corp., both of Detroit, Mich.

1,830,118. **Vibration Dampener.** H. C. Lord, Erie, Pa.

1,830,319. **Pavement Marker.** M. E. Hartzler, Downers Grove, and E. P. Romilly, Chicago, both in Ill.

1,830,337. **Ring.** E. A. Rossner, Detroit, Mich.

1,830,399. **Endless Track.** A. F. Masury, assignor to International Motor Co., both of New York, N. Y.

1,830,570. **Pneumatic Upholstery.** W. H. Smith, Withington, and H. C. Stanley, Erdington, both in England.

1,830,791. **Extensible Band.** V. Guinzburg, assignor to I. B. Kleinert Rubber Co., both of New York, N. Y.

1,830,879. **Railway Wheel with Tire.** A. J. Michelin, Paris, assignor to Michelin et Cie, Clermont-Ferrand, both in France.

1,831,000. **Tire Repair Plug.** A. A. Hawkinson, Minneapolis, Minn.

1,831,106. **Hair Wave Placer.** W. V. Fashing, St. Paul, Minn.

1,831,377. **Telephone Receiver.** N. Blount, Maplewood, N. J., assignor to Bell Telephone Laboratories, Inc., New York, N. Y.

1,831,406. **Diaphragm.** H. Beckmann, Berlin-Zehlendorf, Germany.

1,831,559 and 1,831,560. **Artificial Flower.** R. C. and M. T. Ham, both of W. Haven, assignors to R. C. Ham & Co., Inc., New Haven, all in Conn.

1,831,616. **Garment Supporter.** F. J. Zimmerer and H. W. Bauer, assignors to Russell Mfg. Co., all of Middletown, Conn.

1,831,724. **Armored Hose.** R. J. Stokes, Princeton Township, assignor to Thermoid Rubber Co., Trenton, both in N. J.

1,831,845. **Mercury Switch.** P. K. Cramblet, Milwaukee, Wis., assignor, by mesne assignments, to Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

1,831,925. **Heel.** A. F. Niggle, Jr., Grand Rapids, Mich.

1,831,967. **Self Sealing Tube.** J. J. McCall, Philadelphia, Pa., assignor of ½ to D. N. Safran.

1,832,017. **Sectional Tube and Valve.** A. F. G. Giorchino, New York, N. Y.

1,832,121. **Refrigerating Apparatus.** W. C. Holbrook, assignor to Frigidaire Corp., both of Dayton, O.

1,832,122. **Refrigerating Apparatus.** W. C. Holbrook and L. C. Luneke, assignors to Frigidaire Corp., all of Dayton, O.

1,832,173. **Dental Ligature Applicator.** A. T. S. Yates, Duluth, Minn.

1,832,213. **Blow-out Patch.** O. Jacobsen, Monroe, La.

1,832,604. **Dental Cleaner Package.** B. F. Wupper, Chicago, Ill.

1,832,633. **Exerciser.** A. A. Hendrickson, Jr., Hackensack, N. J.

1,832,744. **Heel.** M. Siegel, Brooklyn, N. Y.

1,832,802. **Tire Repair.** C. H. Zimmerman, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

Dominion of Canada

316,441. **Portable Backgammon Board.** R. A. Bond, Chicago, Ill., U. S. A.

316,464. **Printing Type.** A. Lerner, Montreal, P. Q.

316,553. **Footwear Lining.** Mishawaka Rubber & Woolen Mfg. Co., assignee of C. E. Bradley and C. D. Mason, co-inventors, all of Mishawaka, Ind., U. S. A.

316,675. **Metal Article Coating.** Anode Rubber Co., Ltd., Guernsey, assignee of F. Jaeger and L. Havas, co-inventors, both of Budapest, Hungary.

316,720. **Elastic Webbing.** Columbia Narrow Fabric Co., assignee of F. Mongeon, both of Shannock, R. I., U. S. A.

316,750. **Power Transmitting Belt.** Goodyear Tire & Rubber Co., assignee of L. H. Gladwin, both of Akron, O., U. S. A.

316,752. **Tire.** Goodyear Tire & Rubber Co., assignee of G. D. Mallory, both of Akron, O., U. S. A.

316,802. **Insulated Wire.** Simplex Wire & Cable Co., Boston, assignee of R. R. Evans, Watertown, both in Mass., U. S. A.

316,804 and 316,805. **Overshoe.** Springem Overshoe Co., Inc., assignee of E. M. Ramsey, both of Jersey City, N. J., U. S. A., executrix of the estate of G. Ramsey, deceased, in his lifetime of Jersey City, aforesaid, and K. L. Valentine, Jersey City, aforesaid.

316,897. **Upholstery Device.** P. Hahn, Berlin, Germany.

316,903. **Inner Tube.** E. Hibbert, Goulburn, N. S. W., Australia.

316,925. **Artificial Denture.** H. D. Morgan, Youngstown, O., U. S. A.

317,024. **Conveyer Belt.** Goodyear Tire & Rubber Co., assignee of R. S. Carter, both of Akron, O., U. S. A.

317,088 and 317,089. **Draft Gear.** Waugh Equipment Co., assignee of R. J. O'Brien, both of Depew, N. Y., U. S. A.

317,122. **Nonskid Tire Overshoe.** C. C. Pearson, Taunton, Mass., and E. M. McLellan, Cranston, R. I., co-inventors, both in the U. S. A.

317,157. **Massage Beater.** P. Koment, Oakland, Calif., U. S. A.

United Kingdom

353,289. **Vehicle Bumper.** Dunlop Rubber Co., Ltd., London, and W. H. Paull, of Dunlop Rubber Co., Ft. Dunlop, Birmingham.

354,130. **Ball.** A. Candi, Milan, Italy.

354,134. **Railway Vehicle Tire.** Michelin et Cie, Clermont-Ferrand, Puy-de-Dome, France.

354,319. **Bath Grip Device.** H. Weld, London.

354,556. **Tire.** Goodyear Tire & Rubber Co., Akron, O., U. S. A.

354,603. **Gas Mask.** H. Stelzner, Lübeck, Germany.

354,612. **Gas Mask.** Deutsche Gasglühlicht-Auer-Ges., Berlin, Germany.

354,663. **Railway Vehicle Tire.** Michelin et Cie, Clermont-Ferrand, Puy-de-Dome, France.

354,700. **Clamp Fastening.** J. C. Urlacher, Paris, France.
355,070. **Massage Appliance.** P. Koment, Oakland, Calif., U. S. A.

Germany

537,536. **Furniture Spring.** C. Straub, Feuerbach.
538,117. **Soap and Sponge.** G. von Heyman, Berlin-Schoneberg.
538,400. **Container.** J. Samuel, Hamburg.
538,523. **Wheel.** A. Spencker, Stuttgart-Wangen.
539,533. **Tire.** H. Meyer, Berlin-Schoneberg.

Designs

1,191,143. **Sandal.** Neumann & Co., Cologne.
1,191,165. **Respirator.** E. Reckemeyer, Hammeln-Land.
1,191,205. **Wheel.** Dunlop Rubber Co., Ltd., London, England. Represented by B. Kaiser and E. Salzer, both of Frankfurt a. M.
1,191,340. **Heel.** H. J. Geier, Weimar.
1,191,387. **Stopper.** T. Bötticher, Hannover-Ricklingen.
1,191,388. **Hose.** Continental Gummi-Werke A. G., Hannover.
1,191,436. **Cable Connection.** Siemens-Schuckertwerke A. G., Berlin-Siemensstadt.
1,191,437. **Cable Connection Protector.** Siemens-Schuckertwerke A. G., Berlin-Siemensstadt.
1,191,481. **Apron.** M. Heinze, Breslau 21.
1,191,654. **Knee Protector.** Continental Gummi-Werke A. G., Hannover.
1,191,672. **Tennis Ball.** Continental Gummi-Werke A. G., Hannover.
1,191,674. **Toy.** Masonia Rubber Works G. m. b. H., Wandsbek.
1,191,754. **Leather and Rubber Heel.** Seifert & Klober, Naila i. Oberfr.
1,191,755. **Heel.** Seifert & Klober, Naila i. Oberfr.
1,191,982. **Endless Belt.** Dunlop Rubber Co., Ltd., London, England. Represented by B. Kaiser and E. Salzer, both of Frankfort a. M.
1,192,004. **Hammock with Rubber Mattress.** F. Egner, Kupferzell i. Wurttbg.
1,192,014. **Air Cushion.** Hartmann & Co., Friedberg i. Hess.
1,192,212. **Mat.** Rekord Gummiwaren G. m. b. H., Berlin N. 65.
1,192,357. **Cushion.** Continental Gummi-Werke A. G., Hannover.
1,192,520. **Brush.** Pumpfix - Vertrieb Adolf Gerken Nachf., Hamburg 4.
1,192,580. **Heating Pad.** M. Oppenheimer, Frankfort a. M.
1,192,847. **Printers' Roller.** Continental Gummi-Werke A. G., Hannover.
1,192,862. **Inner Tube Protection.** Velo-Sportartikelfabrik Bruckmann & Co., Honnef a. Rh.
1,192,868. **Mat.** G. Tasche, Bochum.
1,192,901. **Cover.** F. Szepanscky, Hannover-Linden.
1,192,909. **Cushion.** Continental Gummi-Werke A. G., Hannover.
1,193,092. **Heel.** W. Schlichting, Schwerin i. Mecklb.
1,193,164 and 1,193,165. **Garter.** P. Hirschhausen, Jarvenpaa, Finland. Represented by W. Esch, Hamburg 21.
1,193,199. **Hot Water Bottle.** Dunlop Rubber Co., Ltd., London, England. Represented by R. and M. M. Wirth, C. Weihe, and H. Weil, all of Frankfort a. M., and T. R. Koehnhorn, Berlin S.W. 11.
1,193,226. **Tubing.** C. Cremer, Kopenick-Wendenschloss.
1,193,326. **Hose.** Berliner Gummiwaaren-Fabrik Paersch & Kerstan, Berlin S.W. 68.
1,193,601. **Metal with Protected Surface.** New York Hamburger Gummi-Waaren Co., Hamburg 33.
1,193,617. **Bathing Cap.** I. and L. Dorogi and Dr. Dorogi es Tarsa Gummigyar R. T., Budapest-Albertfalva, Hungary. Represented by J. Reitstotter, Berlin-Steglitz.
1,193,853. **Sole.** Gummiwerke Ullrich G. m. b. H., Gelnhausen.
1,194,029. **Apron.** Firma M. Steinberg, Koln-Braunsfeld.
1,194,235. **Roll.** Piassavawerke Hermann Wimmer, Kappelrodeck i. B.
1,194,251. **Seat Bumper.** H. Schilbock, Dusseldorf.
1,194,348. **Bandage Cover.** W. Sohngen & Co., Wiesbaden.
1,194,549. **Syringe.** J. Gaupp, Stuttgart.
1,194,629. **Bicycle Valve.** Continental Gummi-Werke A. G., Hannover.
1,194,697. **Lather Catcher.** C. Waiblinger, Nagold.

Trade Marks

United States

288,359. **Softex.** Waterproofed fabrics. I. B. Kleinert Rubber Co., New York, N. Y.
288,411. **Perfectos.** Rubber goods. T. W. Grace Co., Dallas, Tex.
288,423. **Anti-Age.** Preservatives. Binney & Smith Co., New York, N. Y.
288,427. **Insul-Dek.** Roofing deck. St. Clair Rubber Co., Detroit, Mich.
288,484. **Sanilactic.** Prophylactic articles. R. J. Pierce, Inc., New York, N. Y.
288,523. **Chrystaline.** Chemically treated fabrics. N. Ginsburg, doing business as Para Rubber Co., assignor to Para Mfg. Co., both of Newark, N. J.
288,536. **Hudderton.** Raincoats. A. Decker & Cohn, Inc., Chicago, Ill
288,625. Diamond containing the numbers: **"5040."** Belts. United States Rubber Co., New York, N. Y.
288,630. **Latexeam.** Tennis balls. A. G. Spalding & Bros., New York, N. Y.
288,631. **Permawelt.** Tennis balls. Wright & Ditson, Boston, Mass.
288,673. Representation of a woman and a dog below which is the word: **"Stylgait."** Footwear. Hahn Department Stores, Inc., Wilmington, Del.
288,680. Fanciful design containing the word: **"Astrild,"** and above and below, the words: **"Hanan, Trade Mark, New York."** Footwear. H. W. Hanan, doing business as Hanan & Son, Brooklyn, N. Y.

United Kingdom

523,053. Representation of the Fisk Boy and the words: **"Time to Retire."** All goods in Class 40. Fisk Rubber Co., Chicopee Falls, Mass., U. S. A.
524,737. **Darex.** Material for heels in sheet form. Dewey & Almy, Ltd., London, N. 18.
525,261. **Sto-Tip.** Tips for boots and shoes. Redfern's Rubber Works, Ltd., Hyde, Cheshire.
525,652. **Velatex.** Floor covering. India Rubber, Gutta Percha & Telegraph Works Co., Ltd., London, W. C. 2.
525,727. **Cyclops.** Golf balls. Henleys Tyre & Rubber Co., Ltd., London, E. C. 2.

Designs

United States

84,305. **Golf Ball Painting Machine Casing.** Term 14 yrs. R. C. Smith, Los Angeles, Calif.
84,326. **Ornamented Rubber.** Term 14 yrs. J. J. Conway, W. Haven, assignor to Seamless Rubber Co., Inc., New Haven, both in Conn.
84,328. **Sheeting.** Term 14 yrs. W. W. De Laney, assignor to Seamless Rubber Co., Inc., both of New Haven, Conn.
84,438. **Desk.** Term 14 yrs. E. A. Purnell, assignor to General Fireproofing Co., both in Youngstown, O.
84,489. **Soap Dish.** Term 3½ yrs. A. L. Murray, Auburn, Ind.
84,528. **Tire.** Term 14 yrs. N. La Jone, assignor to Inland Rubber Co., both in Chicago, Ill.
84,586. **Matting.** Term 14 yrs. R. K. Lee, Highland Park, Mich.
84,646. **Sole.** Term 7 yrs. A. L. Murray, Auburn, Ind.
84,803. **Heel.** Term 14 yrs. A. C. Bain, Hudson, assignor to Firestone Footwear Co., Boston, both in Mass.
84,963. **Tire.** Term 14 yrs. R. Smith, Gosport, Ind.
85,003. **Tire Casing.** Term 14 yrs. B. R. Prall, assignor to Montgomery Ward & Co., Inc., both of Chicago, Ill.
85,032. **Tire.** Term 14 yrs. B. Darrow, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
85,034. **Tire.** Term 3½ yrs. M. A. Dreher, assignor to Morgan & Wright, both of Detroit, Mich.
85,169. **Tire.** Term 14 yrs. B. Darrow, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
85,209. **Tire.** Term 14 yrs. E. M. Sears, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
85,308. **Tire.** Term 3½ yrs. D. K. Sloteman, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
85,318 and 85,319. **Waterproof Footwear.** Term 3½ yrs. L. M. Bitgood, New London, assignor to Goodyear's India Rubber Glove Mfg. Co., Naugatuck, both in Conn.
85,333. **Sole and Heel.** Term 7 yrs. E. C. Heilhecker, Bristol, R. I., assignor to Goodyear's India Rubber Glove Mfg. Co., Naugatuck, Conn.
85,482 and 85,483. **Running Board Mat.** Term 14 yrs. C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

Dominion of Canada

9,291. **Rubbers.** Miner Rubber Co., Granby, P. Q.
9,307. **Tire.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.
9,317. **Hose.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.
9,321. **Tire.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.
9,363 and 9,370. **Tire.** Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont.

Market Reviews

Crude Rubber

New York Exchange

AFTER breaking through to a new all-time low record at 4.10 cents early in the month, rubber recovered smartly and reached 5 cents, closing the month a little lower than the latter figure.

Responsibility for the recovery is due entirely to restriction rumors. Traders were told that the Dutch and British were seriously considering a plan for a 50 per cent cut, and cables were received commenting on the almost certain probability that a drastic plan would be adopted.

But most traders had heard those rumors before, and their skepticism seemed to be justified later. Prior to going to press a cable from Amsterdam stated that no "cut and dried plan" had been agreed upon. The situation may develop into another futile cry of "wolf," or it may deliver one of the "plans" that the rumor market trades on so frequently.

A number of traders, while skeptical as to practical action, believe that restriction ought to be and could be enforced. Pointing out that the only thing necessary is an agreement by 2 principal producers, the British and the Dutch, these traders feel that restriction is a logical step.

The opinion among British manufacturers is quite generally in favor of restriction, as is proven by their comments given later in this report. The Dutch are anxious for it because they are at a disadvantage at present in competing with England because of her depreciated currency.

Symington & Wilson, for instance, in a report published in London on December 9 say, "In our recent reports we have laid stress on the rapid increase in stocks owing to increasing shipments and decreasing consumption and it can hardly be necessary at this point to stress the importance of coming to some working arrangement with the Dutch. If the present negotiations do in fact break down, it will mean the ruin of more than half of the British and Dutch rubber producing companies but as we pointed out in our report of November 25, this merely means the entire loss of the capital of the present investors."

Week ended November 28. Quiet trading was the rule prior to the Thanksgiving Day holiday, but after returning to the market, traders sent prices down to within a few points of all-time low records on Friday.

Part of Friday's decline was due to news that Dutch East Indies shipments for October had increased. They were 25,925 tons, compared with 21,667 shipped in September and 19,533 tons shipped in October, 1930. A weak sterling exchange and softness in stocks and grains also contributed to the decline.

It was also announced during the week that tire prices had been cut from 5 to 12 per cent by one of the tire companies. Just a short time ago, rubber executives had gone on record as being opposed to reduced tire prices. They pointed out the fact that the rubber industry as a whole earned only about 1 per cent on its investment in 1930, against 1½ per cent in 1929, and 3 per cent in 1928. Banking interests and manufacturers were also said to be opposed to price reductions. The large companies believe that in spite of the lower prices they will be able to equal this year's earnings because of the economies effected in operating costs.

Figures on automobile production for October showed the lowest output in 10 years. Production was only 80,142 vehicles, or 60,424 less than in September, and 74,259 less than in October, 1930. It was 299,875 units less than in October, 1929, according to the Department of Commerce.

For the first 10 months of 1931, production was 2,199,330 cars, against 3,063,531 in the same period last year, and 5,020,840 in the first 10 months of 1929. Passenger car production in this period declined 2,483,837 units. The same condition existed in Canada. Production was only 1,440 vehicles for October, compared with 2,646 in September, 4,541 in October, 1930, and 14,523 in October, 1929. Only 761 passenger cars were produced and 679 trucks.

Prices at the close of November 28 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Dec.	4.37	4.36	4.36	4.37
Jan.	....	....	4.43	4.43
Feb.	....	....	4.50	4.50
Mar.	4.59	4.57	4.57	4.56/4.58
Apr.	....	....	4.63	4.63
May	4.68	4.68	4.67/4.68	4.70
June	....	....	4.73	4.74
July	4.82	4.79	4.79	4.79/4.82
Aug.	....	....	4.85	4.85
Sept.	4.95	4.95	4.91/4.93	4.92
Oct.	....	....	5.00/5.01	5.00/5.03
Spot	....	....	4.37	4.38

Week ended December 5. Malayan shipments, although not so large as indicated by mid-month estimates were higher than the previous month and those in November last year. The November total was 48,012 tons, compared with 45,911 tons in October, and 41,281 tons during November, 1930. These shipments have been increasing at a steady rate since last August, when the total was 42,832 tons.

Native producers certainly are not making money at the prevailing prices. In the last week, December delivery in the old A contract reached a new low at 4.20 cents, duplicating the all-time low record. The elimination process seems to be going on, however, and in time a number of companies should be weeded out.

A rumor in the market on Friday to the effect that the Dutch were refusing to sell rubber because of the fact that they seriously believed that restriction would become effective, steadied prices considerably. One reason that this rumor was given credence was expressed by a trader, who said that the depreciated pound is giving the English producers an advantage over the Dutch producers. Although both get the same nominal price, the money received by the British is worth a couple of cents more in terms of the pound.

This advantage, if long continued, will be a handicap to the Dutch, and for that reason it is believed that the Dutch will make a determined effort to put through a restriction scheme that will level the difference between them and the English.

Another view was given by a correspondent of H. Hentz & Co., who declared, "A fight to a finish, or, as it is called, the survival of the fittest, will be a very long drawn out process, and in its final analysis a very undesirable one, because looking into the future it would mean an insufficiency of supplies and famine prices. Thus, it seems almost inevitable that something must come out of the British and Dutch negotiations, and, notwithstanding the objectionable features of any government control, it may be found the lesser of two evils."

RUBBER BEAR POINTS

1. Pneumatic casings shipped in October were 27.5 per cent less than in September and 18.5 per cent below October, 1930.
2. Production of pneumatic casings was 6.2 per cent less than in September, and 17 per cent less than in October last year.
3. November consumption of crude rubber in the United States was 22,943 tons, against 22,277 in October, and 23,479 in November, 1930.
4. Domestic stocks of rubber on November 30 were 7 per cent above October 31, and 54 per cent above those on November 30, 1930.
5. Crude rubber afloat for the United States was 77,443 tons on November 30, against 68,427 on October 31, and 52,538 on November 30, 1930.
6. Malayan shipments for November were 48,012 tons, against 45,911 tons in October, and 41,281 tons in November, 1930.
7. October and November automobile output was the lowest for 10 years.
8. Production of rubber on small estates in Malaya was 17,327 tons in November, against 16,283 in October; production on large estates was 21,105 tons, against 21,191 tons.
9. Dealers' stocks of crude rubber in Malaya were 20,865 tons, against 17,988 tons in October.
10. Estate stocks in the Far East on November 30 were 21,800 tons, against 20,295 tons on October 31.

RUBBER BULL POINTS

1. Pneumatic casings on hand October 31 were 1.7 per cent over September 30, but 15.3 per cent below October 31, 1930.
2. There are prospects of increased activity in the automobile and the tire industries.
3. The demand for motor fuel oil was 2 per cent greater in the third quarter of 1931 than in the same period of 1930.
4. Restriction rumors have it that the Dutch and British are again negotiating.
5. Tire prices were cut 10 to 19 per cent, to all-time low levels, by manufacturers, mail-order houses, and oil companies.
6. Ceylon shipments for November were 4,853 tons, against 5,102 tons in October, and 6,275 tons a year ago.
7. Exports of Malayan rubber for the 11 months to November 30 were 390,974 tons, against 403,901 tons in 1930.
8. Sales on the Exchange during November amounted to 26,027 long tons, against 12,702 in October, and 17,350 for November, 1930.

Details of the Malayan figures reveal that the rubber shipped to the United States during November was 36,049 tons, compared with 32,872 tons in October, and 22,200 tons in November, 1930. Shipments to all other countries were smaller than in the previous month, with the exception of those to Japan.

Ceylon exported 4,853 tons to all countries during November, against 5,102 tons during October, and 6,275 tons in November, 1930.

The cut in prices of tires started last week was adopted by seven more companies in the past week. Cuts ranged from 10 to 19 per cent and carried tire prices to the lowest levels in their history.

Prices at the close of December 5 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Dec.	....	....	4.40	4.40/4.45
Jan.	....	....	4.45 Asked	4.47
Feb.	....	....	4.52	4.54
Mar.	....	....	4.60	4.62/4.64
Apr.	....	....	4.65	4.66
May	....	....	4.70	4.71/4.73
June	....	....	4.75	4.77
July	....	....	4.81	4.83
Aug.	....	....	4.88	4.89
Sept.	....	....	4.95	4.95
Oct.	....	....	5.02	5.02/5.06
Nov.	....	....	5.12	5.12
Spot	....	....	4.42	4.44

Week ended December 12. After dropping to 4.10 cents, a new all-time low record, the rubber market recovered almost ½-cent upon restriction news.

Early cables stated that the British proposal for a 50 per cent reduction had been accepted by the Dutch, but later cables stated that reports of an agreement to restrict rubber outputs by 40 per cent or 50 per cent were considered premature by the London trade. But the opinion persisted that the Dutch are anxious to press the matter in view of the losses sustained by the Dutch East Indies Government since Great Britain abandoned the gold standard on September 2, last.

Markets in London, Singapore, and New York firmed on these reports, and the 50 per cent restriction plan may have the required backing this time. The strongest factor in favor of the plan is the disadvantage that the British pound has worked against the Dutch. As long as they could tap rubber and get something for it they could struggle along; but if buyers take British rubber because the lower value of the pound permits them to make use of the lower exchange rate, the Dutch are not able to sell rubber even at these starvation prices.

Still we must not lose sight of a fact which we have mentioned more than once. Growers have been producing at low prices for so long a time that many of them are just hanging on, waiting for better prices. To run their estates they have been tapping their trees without regard to future productivity. Over-tapping cannot be continued for any indefinite stretch of time, and it is the belief of many traders that a few more months will see an inevitable cleaning out process that will eliminate weak growers and strengthen the position of those remaining. To these traders artificial restriction agreements are merely an interruption of a drastic but healthful economic process. They are hoping that the latest and strongest move toward restriction by mutual consent will drop by the wayside with those others that have been proposed regularly in the last few years.

Dealers' stocks of crude rubber in the Far East totaled 41,372 tons at the close of November, against 39,497 tons at the end of October. Harbor Board stocks at Singapore and Penang were reduced more than 7,400 tons, totaling 4,145 tons, against 11,625 tons at the close of October. This sharp drop was a result of the low freight rates which prevailed during part of November.

New York may soon receive competition from Vancouver as a distribution port for rubber. Negotiations are reported to be under way between representatives of Singapore rubber shippers and officials of the Canadian Pacific Railway, according to notice received by the *Herald-Tribune* by R. M. Prior.

"An initial business of 1,000 tons a month will go to Vancouver if satisfactory arrangements for rates and storage can be made with the Canadian Pacific Railway," Mr. Prior is reported as saying. "Stocks of rubber will be kept there for distribution as need arises to the manufacturers in Toronto, Hamilton, Montreal, and to Akron, O., plants whose management does not insist upon carriage of their raw materials over United States steamship and rail lines."

Prices at the close of December 12 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Dec.	....	....	4.52	4.52
Jan.	....	....	4.59	4.59
Feb.	....	....	4.67	4.67
Mar.	4.75	4.70	4.75/4.78	4.75/4.78
Apr.	....	....	4.80	4.80
May	....	....	4.85	4.85/4.90
June	....	....	4.90	4.91
July	4.94	4.89	4.96/4.98	4.98
Aug.	....	....	5.03	5.05
Sept.	5.08	5.05	5.10	5.12
Oct.	....	....	5.17	5.19
Nov.	....	....	5.25	5.27
Spot	....	....	4.53	4.54

Week ended December 19. Restriction was the most important news in the market for the week and was responsible for most of the almost ½-cent gain in the rubber market. Firmness in other markets had a bearing on the advance, but a growing belief that an agreement has been or soon will be reached between the Dutch and the British has caused most of the short covering and active general buying. In the half session on Saturday reports of action on restriction, though unconfirmed, sent the market climbing, and prices closed 20 to 40 points up for the day.

The Department of Commerce, in its latest bulletin, publishes comments from the leading newspapers and rubber merchants in England. The preponderant opinion is that "restriction must come." A few of the comments might prove interesting.

"Should the conversations between British and Dutch producing interests prove abortive a difficult situation will arise," says one.

"The expectation of restriction is the only prop to the tottering structure of the rubber edifice," says another.

"A declaration by the Dutch Government is due very shortly. Rubber circles do not believe it will amount to a flat repudiation of restriction," conservatively says a large newspaper. One company expresses the belief that "the initiative must come from the Dutch."

Opposed to the restrictionists are those "keenly against any form of government interference." The views of several rubber estate officials published in the same bulletin show that many of these men favor a natural working out of the problem.

A few of their remarks are: "Acquiring at a 'song' estates which fall by the way is near at hand." "Even at an average sales price of 3¼d. we made a profit, without reducing cultivation and upkeep, or asking employes to sacrifice salary." "Last month our f. o. b. cost of rubber production was just over 1½d. per pound, which is considered almost a record low."

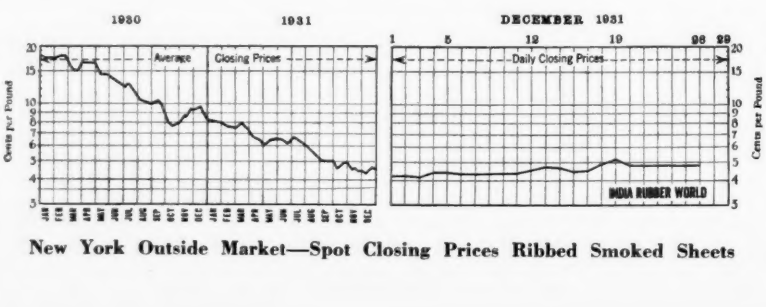
The way it looks at present, the question of whether the government shall be permitted to impose restriction, or whether economic forces shall be permitted to work naturally, will be decided definitely in a short time.

The November consumption report was released during the week, but was not received very favorably. Although November consumption was 3 per cent higher than it was in October, it amounted to only 22,943 tons, against 22,277 in October, and 23,479 tons in November, 1930. But imports of crude rubber for the month were 43,733 long tons, an increase of 5.6 per cent over the October total of 41,395

RUBBER EXCHANGE ACTIVITIES

Week Ended	Transactions: Contracts Sold Number	Contracts Sold Tons	Transferable Notices	Week-End Tone
Nov. 28	420	1,050.0	1	Quiet
Dec. 5	681	1,702.5	26	Dull
Dec. 12	682	1,705.0	42	Quiet & steady
Dec. 19	587	1,467.5	38	Steady
Dec. 26	342	855.0	60	Quiet
Totals ...	2,712	6,780.0	167*	

*Actual deliveries of rubber.



New York Outside Market—Spot Closing Prices Ribbed Smoked Sheets

tons, and an increase of 37.7 per cent over November last year, thus completely nullifying the effect of the slight increase in consumption.

Domestic stocks of crude rubber on November 30 were put at 292,493 long tons, an increase of 7 per cent over October 31, and of 54 per cent over November 30, 1930. Crude rubber afloat for the United States ports on November 30 was estimated to be 77,443 long tons, against 68,427 on October 31, and 52,538 on November 30, 1930.

Prices at the close of December 19 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Dec.	....	....	5.00	4.69
Jan.	....	....	5.07	4.74
Feb.	....	....	5.14	4.79
Mar.	5.28	5.03	5.22	4.84
Apr.	....	....	5.27	4.89
May	5.40	5.16	5.33/5.36	4.94
June	....	....	5.38	5.00
July	5.55	5.25	5.44/5.46	5.05
Aug.	....	....	5.49	5 11
Sept	5.60	5.35	5.54/5.56	5.18/5.20
Oct.	....	....	5.62	5.26
Nov.	....	....	5.70	5.34
Spot	....	....	5.02	4.71

Week ended December 24. Easing off ¼-cent Monday, the market turned steady in the rest of the short week. Trading was light, and dealers did little business before the 2-day holiday.

The drop was caused by a cable that stated that a definite plan for restriction had not been agreed upon, and the disappointing census figures from the Far East.

Production of rubber by small estates, largely native, in Malaya increased from 16,283 tons in October, to 17,327 tons in November. Production on large estates, mostly European-owned, decreased from 21,191 to 21,105 tons.

Dealers' stocks of crude rubber at the same time were increased from 17,988 tons to 20,865 tons; while stocks on estates were increased from 20,295 tons at the end of October to 21,800 tons at the close of November.

Prices at the close of December 26 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
Dec.	....	....	4.72	4.70
Jan.	4.86	4.82	4.82	4.78
Feb.	....	....	4.93	4.87
Mar.	5.07	5.02	5.05	4.96/4.98
Apr.	....	....	5.10	5.02
May	5.15	5.12	5.15	5.08
June	....	....	5.20	5.14
July	5.30	5.29	5.26/5.30	5.20
Aug.	....	....	5.32	5.25
Sept.	....	....	5.38/5.42	5.30
Oct.	5.50	5.50	5.48/5.51	5.39
Nov.	....	....	5.58	5.49
Spot	....	....	4.75	4.72

N. Y. Outside Market

A little better demand from the automobile industry following the introduction of new models has been responsible for a fairly good volume of business in the past month. Prices are better than they were at the beginning of the month: dealers' tire and automobile stocks are low; and if the intensive campaigns being staged by automobile manufacturers bear the results expected, prices should remain steady.

The steel men, according to several trade reports are looking to the automobile industry to help them out of their slump.

A Rubber Parable

Once upon a time the Lord was walking along a road and He saw sitting by the wayside a man weeping, so He touched him and said to him: "Why do you weep?" and the man said, "I had a good job and good pay, but the depression came and I have lost all." And the Lord said, "Rise and follow Me," and He found him a new job with higher pay and left him happy.

And He went further along the road and found another man sitting and weeping by the wayside; so He touched him and said to him: "Why do you weep?" and the man said, "I had a dearly beloved wife who is dead, and I am alone." And the Lord said, "Rise and follow Me," and He found him a beautiful wife and left him happy.

And He went still further along the road and found yet another man sitting weeping; so He said to him, "Why do you weep?" and the man said, "I am in the Rubber Trade and have no business," and the Lord sat down next to him and wept also.

New York Quotations

Following are New York outside market rubber quotations in cents per pound for one year ago, one month ago, and Dec. 26.

Plantations	Dec. 26, 1930	Nov. 24, 1931	Dec. 26, 1931
Rubber latex...*gal.*	75	69	69
Sheet			
Ribbed, smoked, spot	8 3/16/8 5/16	4 7/16/4 5/16	4 7/16/4 1/8
Dec.	8 3/16/8 5/16	.....	4 7/16/4 1/8
Jan.-Mar.	8 1/2/8 7/16	4 3/4	5
Apr.-June	8 7/16/9 1/4	4 7/16	5 1/16/5 1/4
CREPE			
No. 1 Thin latex, spot	8 3/4/9	4 1/8/5 1/16	5 3/16/5 1/16
Dec.	8 3/4/9	.....	5 3/16/5 1/16
Jan.-Mar.	9 /9 1/4	5 1/16/5 1/16	5 1/16/5 1/2
Apr.-June	9 3/16/9 1/2	5 3/16/5 3/16	5 1/2/5 5/16
No. 2, Amber, spot	7 7/16	4 3/16	4 5/16/4 3/4
Dec.	7 7/16	.....	4 5/16/4 3/4
Jan.-Mar.	8 /8 1/4	4 1/2/4 5/16	4 3/4/4 1/8
Apr.-June	8 1/4/8 1/2	4 5/16/4 1/8	4 7/16/4 1/8
No. 3, Amber, spot	7 5/16/7 3/4	4 1/4/4 5/16	4 1/2/4 1/8
No. 1 Brown	7 7/16	4 3/16/4 1/2	4 3/4
No. 2 Brown	7 3/4	4 1/4/4 5/16	4 5/16/4 1/8
Brown, rolled	7 1/2	4 /4 1/8	4 1/4/4 7/16
PONTIANAK			
Bandjermasin	6	6	5
Pressed block	12	9	8
Sarawak	6	6	5
PARAS			
Upriver fine	11 1/2	5 3/4	†5 7/8
Upriver fine	*14 1/2	*9 1/2	*9 1/2
Upriver coarse	7 3/4	†3 1/2	†3
Upriver coarse	*10	*5	*5
Islands, fine	10 3/4	†5	†5 1/4
Islands, fine	*14 1/4	*9	*9

	Dec. 26, 1930	Nov. 24, 1931	Dec. 26, 1931
Acre, Bolivian, fine	11 3/4	6	6 1/4
Acre, Bolivian, fine	*14 3/4	*10	*10
Beni, Bolivian	12	6	6 1/4
Madeira, fine	11 1/2	5 3/4	6
CAUCHO			
Upper ball	7	†3	†3
Upper ball	*10	*5	*5
Lower ball	6 1/2	†2 1/2	†2 1/2
Manicobas			
Manicoba, 30% guar.		†5	†4 1/2
Mangabiera, thin sheet		†5	†4 1/2
Guayule			
Duro, washed and dried	15	13	13
Ampar	16	14	14
Gutta Percha			
Gutta Siak	13 1/2	10	9
Gutta Soh	29	18	17
Red Macassar		2.00	1.75
Balata			
Block, Ciudad Bolivar	32	20	20
Colombia	32	..	20
Manaos block	37	20	20
Surinam sheet	57	45	40
Amber	60	48	45

* Washed and dried crepe. Shipment from Brazil.
† Nominal.

Several manufacturers of high-priced cars are operating at full time, and one low-priced manufacturer has introduced a new and improved model. Another low-priced maufacturer has not yet announced his plans.

The burdensome stocks of rubber, of course, cannot be overlooked even in the most optimistic predictions. They hold prices down as effectively as a champion wrestler can pin his opponent to the mat.

Two things, nevertheless, deserve attention. One is that pneumatic casings on hand on October 31 were 15 per cent less than last year; and the other is that gasoline consumption has declined little, if at all. Automobiles are being run; the gasoline consumption figures prove it. But cars and tires are lasting longer, as proved by the lower sales of casings. When the limit of endurance is reached in these old tires and cars, sales will pick up. It is the same in all business, of course, and it is the turn for which we are patiently waiting.

The Dutch and the British have been reported as negotiating again for restriction; but so far the meetings have been veiled in secrecy, and only conflicting rumors have been received.

The outlook, therefore, is obscured by many uncertainties. Until they are cleared up, things will drift along as they have for the past months.

Week ended November 28. With standard ribs at about 4½ cents, buyers are still aloof from the market. One reason for this lack of buying may be seen in the fact that October automobile production at 80,142 units was the lowest in 10 years.

The drastic decline in automobile production may have been partly due to the fact that manufacturers closed down prior to going on production of new models. But as one observer remarked, "all that they are likely to produce for some time is new models."

A writer for *The New York Times* said, "Although automobile executives believe there will be a moderate improvement in general business conditions next year, they feel that their own industry may have to wait until 1933 for any sharp increase in production."

The same opinion is held by a number of traders. Much talk has been going on about the expected increase in purchases by the public following the exhibition of

new models, but these predictions are hopes rather than facts.

Other traders point to predictions made by R. G. Dun & Co. and by other commentators, such as *Iron Age*.

Dun said, "The effect of the anticipated buying movement is reflected in the basic material markets, promising an upturn in general business as soon as the motor industry swings into 1932 production. With 26,000,000 motor vehicles now in use, more than 2,000,000 are due to be scrapped which means a substantial backlog for next year. . . . Most dealers are carrying lighter inventories than the average of the last 7 years, and buying is mainly for current requirements. . . ."

Estimating that Ford will require 300,000 tons of steel in the next few months, *Iron Age* says that a greater demand from Ford "may do much toward stimulating the lagging purchases of other automobile manufacturers, since delays in Ford's production of new models have held back final plans of some other companies."

The next few months will tell the true story, and until then an accurate prediction is hard to make.

Prices at the close of November 28 were:

Spot	Nov. 28	Month Ago	Year Ago
Crepe	4¾	4⅞	9⅜
Ribs	4½	4½	9
Upriver fine ...	5¾	6	12¼

Week ended December 5. Six more large companies cut tire prices in the past week, and one large oil company. The slashes, ranging from 10 to 19 per cent, sent tire prices to the lowest levels in the history of the industry. The cut, in the opinion of some traders, was unfortunate. Whether it will boost tire sales is doubtful; and even if it does, the profit made by the companies will probably be less because the margin is so narrow.

Immediate developments within the market showed no improvement. The market steadied a good deal on a rumor that the Dutch were withholding rubber from the market in the firm belief that restriction will be enforced in some form. The Malayan shipments for November have aggravated the poor statistical position of the industry, and it is believed that the only way to stop the ruinous production race between natives and European growers is by government control.

November Malayan shipments were 48,012 tons, against 45,911 tons in October and 41,281 tons in November, 1930. Ceylon exported 4,853 tons in November, against 5,102 tons during October, and 6,275 tons in November, 1930.

The chance of recovery in prices is small under the weight of these figures; that condition is one reason for the dullness in the actuals market. The market is dragging along at a snail's pace, marking time until improvement in general business conditions loosens the pursestrings of the buying public.

Prices at the close of December 5 were:

Spot	Dec. 5	Month Ago	Year Ago
Crepe	4⅛	4⅜	9⅛
Ribs	4⅞	4⅞	9⅛
Upriver fine ...	5½	5¾	12¼

Week ended December 12. With automobile manufacturers introducing their new models and indications of greater activity at Detroit, it is expected that buyers will soon come into the market in greater numbers. The determined effort which the British and the Dutch seem to be making to effect a restriction agreement brought some representatives in the market under the belief that if the plan went through, prices would work themselves to higher levels.

Chances looked bright for a day or so when it was reported that the cut of 50 per cent in output proposed by the British was favored by the Dutch, but it was later learned that nothing definite had been accomplished. A significant fact, however, is that the gain in prices engendered by the first report of successful negotiations was not lost when it was learned that discussions were still under way. Until a decisive report is given restriction news will probably dominate the market.

The October report on casings has just been received. It shows that shipments were 27.5 per cent below September; whereas the normal seasonal decline is 13.1 per cent. The total was 2,851,653 casings for October, or 18.5 per cent below the figure for October, 1930.

Production of casings was 2,973,755, or 6.2 per cent less than in September, and 17 per cent less than in October, 1930. Casings on hand October 31 totaled 8,300,065, or 1.7 per cent more than in September, but 15.3 per cent less than in October, 1930.

Production of automobiles was only 7,745 cars in the first week of December, against 7,375 in the preceding week, and 38,891 in the corresponding week last year, according to Cram's *Automotive Reports*. But it is reported that one manufacturer of low-priced cars intends to produce at the rate of 1,500 cars a day for December, and another in the same field intends to start operations about the middle of the month. When a clearer picture can be seen of the outlook in the automobile field, general business conditions will be easier to read.

Prices at the close of December 12 were:

Spot	Dec. 12	Month Ago	Year Ago
Crepe	4⅞	5⅛	9¼
Ribs	4⅝	4⅞	9⅜
Upriver fine ...	5½	6¼	12¼

Week ended December 19. With better prices prevailing, business picked up in the N. Y. Outside Market. Dealers held their offerings for the best prices, and buyers were unable to shade them.

Strong rumors from London that a definite agreement had been reached on a restriction said to call for a cut of 50 per cent in output, together with strength in the stock and the bond markets, helped prices to make a substantial advance during the week.

Automobile orders are reported responsible for the highest operating rate in 3 months among certain steel manufacturers in the Youngstown, O., district, and the more active schedule was apparently being continued for some time.

A report from the Volunteer Committee on Petroleum Economics made to the Secretary of the Interior reveals that demand for motor fuel oil was 2 per cent greater in the third quarter of 1931 than in the same period of 1930. For the 9 months from October 1, 1931, to June 30, 1932, the Committee estimates that domestic motor fuel demand will amount to 289,000,000 barrels, an increase of 1.9 per cent over the same period in the last year. A good deal of this increase is due to a larger number of taxicabs, but it is still a cheerful sign that promises a healthy replacement demand in the future.

One of the large tire companies is reported to be speeding up production from an output of 4,000 tires daily to 5,000 tires a day.

Other statistics were not so favorable. Consumption in the United States for November was 22,943 long tons, against 22,277 in October and 23,479 in November, 1930. Imports were 43,733 long tons. Domestic stocks at the end of November were 7 per cent higher than on October 31, and 54 per cent over November 30, 1930.

Shipments of pneumatic casings for October declined 27.5 per cent under September, compared with an average seasonal decrease of 13.1 per cent. But casings on hand on October 31 were 8,300,065 units, an increase of 1.7 per cent over September, but 15.3 per cent less than at October 31, 1930.

Prices at the close of December 19 were:

Spot	Dec. 19	Month Ago	Year Ago
Crepe	5⅛	5⅛	8¾
Ribs	5⅛	4¾	8½
Upriver fine ...	5½	5¾	12

Week ended December 26. The market reflected the general holiday spirit, and trading was listless. Traders speculated on the latest news from Amsterdam saying that "the rumor that a cut and dried plan for rubber restriction has been agreed upon is denied."

Malayan production on both large and small estates increased in November; while dealers' stocks and those on the estates also increased.

The only note of cheer as far as statistics are concerned was given in a report from Detroit saying, "Leaders in the automobile industry are optimistic regarding the near future because of increasing demands by dealers throughout the country for new models. Plants in Michigan, Ohio, Indiana, and Wisconsin are stepping up production to a point equaling the best periods of activity during the last two years."

Prices at the close of December 26 were:

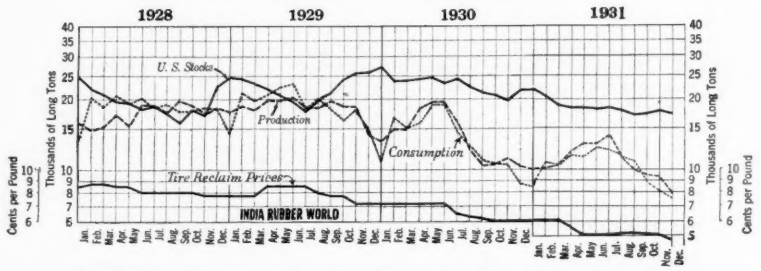
Spot	Dec. 26	Month Ago	Year Ago
Crepe	5¼	4⅞	8⅞
Ribs	4⅞	4⅞	8½
Upriver fine ...	5½	5¾	12

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

No.	Inquiry
1439	Manufacturer of white colored die-stick.
1440	Manufacturer of sponge rubber Fone-kushion.
1441	Manufacturer of sponge rubber with a fabric background.
1442	Source of supply of Silurian Shale.
1443	Manufacturer of combed Egyptian tire fabric.
1444	Manufacturer of rubber dice.
1445	Manufacturer of Thiokol.
1446	Manufacturer of Zalba.

Reclaimed Rubber



Production, Consumption, Stocks, and Price of Tire Reclaim

THE ratio of reclaim to crude consumed in November declined to 31.8 per cent from the ratio of 36.4 per cent maintained in October. Part of the fall may be ascribed to the extra seasonal decline in footwear, mechanicals, insulation, and other lines in which reclaim is essential as a compounding ingredient.

Production of reclaimed rubber for November totaled 7,892 tons; consumption, 7,492 tons; and stocks on hand in the United States at November 30 were 17,662 tons. November exports sharply declined to 395 tons after having jumped to 671 tons in October from 516 in September.

Prices, incidentally, of reclaimed rubber were lower for November. Fractions of about ¼-cent were yielded by almost all grades. The only qualities to remain steady and unchanged were heavy gravity truck tire and light gravity truck tire.

One large manufacturer of reclaim reported that operations were maintained during the entire month at a 5-day-week rate, and 8 hours a day. Considering that in many fields operations are being held down to 3 or 4 days a week, or a full week on a 5-hour day basis, this showing is good in comparison.

Another manufacturer who was reported operating at full-time rates was one making harness wires for electrical appliances. Reclaim makes an ideal insulation, and these harness wires in 6-ft. cords are being produced in substantial numbers. The outlet for these cords is growing with the acceptance of electrical appliances. In the last few years electric refrigerators, washing machines, vacuum cleaners, etc., have increased tremendously in sale, and many of these appliances use harness wires containing reclaim in their insulation.

The outlook for reclaim is no better or no worse than for most businesses. Many developments in the rubber industry are pending: restriction, the recent slash in tire prices, etc., and until the effect these will have on the industry is known, the market for reclaim, and other commodities for that matter, can expect to do little more than at present.

New York Quotations

December 26, 1931

	Spec. Grav.	Price Per Pound
High Tensile		
Super-reclaim, black...	1.20	$0.05½ @ $0.05¾
red	1.20	.05¾ @ .05½
Auto Tire		
Black	1.21	.04¾ @ .04½
Black selected tires....	1.18	.04½ @ .04¾
Dark gray	1.35	.05 @ .05¼
White	1.40	.05¾ @ .06
Shoe		
Unwashed	1.60	.05¼ @ .05½
Washed	1.50	.06 @ .06¼
Tube		
No. 1	1.00	.06½ flat
No. 2	1.10	.05 @ .05¼
Truck Tire		
Truck tire, heavy gravity	1.55	.05¼ @ .05½
Truck tire, light gravity	1.40	.05½ @ .05¾
Miscellaneous		
Mechanical blends.....	1.60	.03¼ @ .03½

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1930	157,967	153,497	41.5	24,008	9,468
1931					
January	10,460	11,003	37.6	20,466	649
February	10,871	10,800	37.5	18,878	625
March	12,938	12,524	38.2	18,375	752
April	13,267	11,745	35.2	18,356	577
May	13,478	13,103	34.6	18,088	798
June	14,066	13,045	34.4	18,505	703
July	11,393	11,447	35.8	17,720	414
August	10,110	9,972	36.1	17,165	410
September	9,629	8,932	37.8	17,226	516
October	9,482	8,126	36.4	17,741	671
November	7,892	7,492	31.8	17,662	395

*Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.

Rubber Scrap

SCRAP rubber collections are ordinarily low this season of the year, and the slight inclination to buy on the part of consumers has slowed the pace still more. The prices offered for collections, moreover, are no incentive to make them.

BOOTS AND SHOES. As an incentive to buy, prices, of course, are very low—so low that collections are hardly worth while for the effort it takes to sort the various qualities gathered. Prices are just about at rock bottom, and there were no changes in this classification from the previous month.

INNER TUBES. The same is true with inner tubes. Collections at the prices quoted would have to be at a loss. A few have been made, but in light quantities. Prices remain unchanged except for No. 2 compound which dropped from 1⅝ to 1¾ cents to 1½ to 1⅝ cents a lb.

TIRES. The profit in tires is not large, but a fair number of sales is made so that collections are in moderate volume. The local market takes most of the tires offered because no profit could be made by outside shipments. Freight rates would erase all the profit; so few are shipped.

Although pneumatic tires, because of their more sturdy construction today compared with a few years ago, are replacing solid tires to a large extent, still a sizable demand exists for solids. The number of solids available for exports is small, and the demand is increasing. Reflecting this demand and limited supply, solids held their prices, while mixed beadless standard pneumatic tires were shaded from $12.50 to $13.00 a ton to $12.00 to $12.50 a ton.

MECHANICALS. Not much demand exists for mechanical grades; so prices did not fluctuate from the previous quotations.

HARD RUBBER. A good demand was shown for hard rubber, and the price of 8¾ to 9 cents quoted last month was maintained.

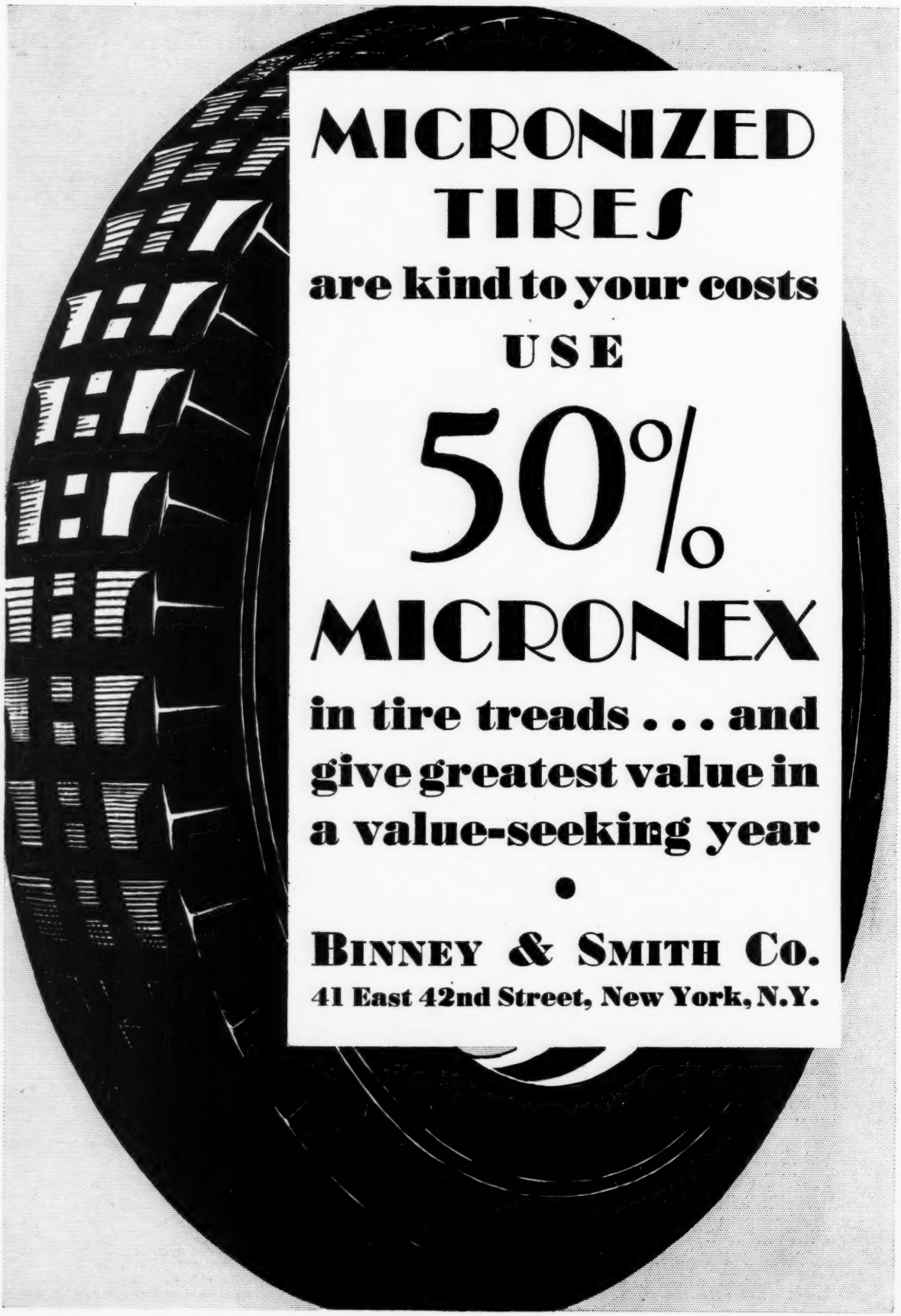
CONSUMERS' BUYING PRICES

Carload Lots

Delivered Eastern Mills

December 26, 1931

	Prices
Boots and Shoes	
Boots and shoes, black..100 lb.	$0.75 @ $1.00
Colored ..... 100 lb.	.625 @ .75
Untrimmed arctics.. 100 lb.	.625 @ .75
Tennis shoes and soles 100 lb.	.50 @ .60
Inner Tubes	
No. 1, floating.....lb.	.03 @ .03¼
No. 2, compound.....lb.	.01½ @ .01⅝
Red .....lb.	.01⅜ @ .01½
Mixed tubes .....lb.	.01½ @ .01⅝
Tires	
Pneumatic Standard	
Mixed auto tires with beads .....ton	8.00 @ 8.50
Beadless .....ton	12.00 @ 12.50
Auto tire carcass .....ton	12.00 @ 12.50
Black auto peelings....ton	19.50 @ 20.00
Solid	
Clean mixed truck....ton	24.00 @ 26.00
Light gravity .....ton	30.00 @ 31.00
Mechanicals	
Mixed black scrap .....lb.	.00⅝ @ .00¾
Hose, air brake .....ton	8.00 @ 9.00
Garden, rubber covered. lb.	.00⅜ @ .00½
Steam and water, soft. lb.	.00⅜ @ .00½
No. 1 red.....lb.	.01¼ @ .01⅜
No. 2 red .....lb.	.01 @ .01⅛
White druggists' sundries lb.	.01½ @ .01¾
Mechanical .....lb.	.01 @ .01⅛
Hard Rubber	
No. 1 hard rubber .....lb.	.08¾ @ .09


MICRONIZED
TIRES
are kind to your costs
USE
50%
MICRONEX
in tire treads . . . and
give greatest value in
a value-seeking year
•
BINNEY & SMITH CO.
41 East 42nd Street, New York, N.Y.

Compounding Ingredients

RUBBER manufacturing activity in the United States in 1931 was 92 per cent of that in 1930 compared on the basis of the reported consumption of crude rubber for 11 months in each year. Competition was more intense the past year and profits more precarious than in 1930. The attitude toward business improvement in 1932 is hopeful rather than reassuring.

In the past month tire production proceeded at about half capacity, mechanicals at 60 per cent, footwear at 40 per cent largely because of absence of rain or snow in the cities. The insulated wire division is no more active than footwear owing to lack of building and other construction.

ACCELERATORS. Tires are now being cured at 20 pounds of steam instead of 45 pounds as formerly. This practice conserves quality, obviates damage by overcuring, and, incidentally, increases the consumption of accelerators.

AGE RESISTERS. Competition is causing manufacturers to restrict the use of age resisters wherever possible and especially so in the cheap goods. The use of age resisters is extending, however, in the case of rubber thread for textile and golf ball manufacture.

CARBON BLACK. For the past month the work of contracting for supplying 1932 consuming needs has progressed steadily on the basis of 3 cents a lb. f.o.b. Texas. Tire companies generally as well as other important users have contracted.

FILLERS. Kalite, a new high tensile filling material, is announced. It is said also to be an excellent stabilizer of rubber curing quality.

LITHARGE. Stock in casks remained unchanged at 6½ cents a lb. for the first half of December despite 2 reductions in pig lead. The third drop, $2 a ton, in the price of the metal resulted in a drop in litharge to 6¼ cents reported December 21.

LITHOPONE. The price held steady and unchanged for 1932 contracts during December. Consumers deferred orders to keep their inventories down until after the year-end stock taking period.

SOFTENERS. Consuming demand for softeners in general held fair in amount with prices moderate. Prices for all grades of degras were reported unsteady and entirely nominal. Stearic acid was unsteady. Quotations were easy and nominal.

SOLVENTS. Standard and light grades are steady at 5½ cents a gal. for both grades in tank car lots.

ZINC OXIDE. 1932 contracts were quite generally placed during December at unchanged prices. Demand became slower because of the approach of inventorying season. The price is unchanged on both domestic and imported stocks.

New York Quotations

December 26, 1931

Prices Not Reported Will Be Supplied on Application

Abrasives			
Marble flour	ton	$16.00	@
Pumicestone, pwd.	lb.	.02½	@ .04
Rottenstone, domestic	ton	23.50	@ 28.00
Rottenstone, English	lb.	.03¼	@
Silica, spot, l. c. l.	lb.	.02	@ .10
Accelerators, Inorganic			
Lime flour, hydrated	ton		@
Magnesia, calcined, heavy	lb.		@
carbonate	lb.	.06	@ .07
Accelerators, Organic			
Aldehyde ammonia	lb.	.65	@ .67
Altax	lb.		@
Barak	lb.		@
BLE	lb.		@
Butene	lb.		@
Captax	lb.		@
Crylene	lb.		@
paste	lb.		@
DBA	lb.		@
Di-esterex N.	lb.		@
DOTG	lb.	.42	@ .43
DPG	lb.	.30	@ .31
Ethylidine aniline	lb.	.45	@ .46
Formaldehyde aniline anhydro	lb.	.37½	@ .38½
Grasselerator 808	lb.		@
833	lb.		@
Heptene	lb.		@
base	lb.		@
Hexamethylenetetramine	lb.	.58½	@ .59½
Hydrone	lb.		@
Lead oleate, No. 999	lb.	.125	@
Witco	lb.	.10	@
Lithex	lb.		@
Methylene dianiline	lb.	.37½	@ .38½
Monex	lb.		@
Novex	lb.		@
Phenex	lb.	.50	@ .55
Plastone	lb.		@
R & H 40	lb.	.40	@ .41
50	lb.	.40	@ .41
50-D	lb.	.40	@ .41
397	lb.	.75	@ .76
Retardex	lb.	.35	@ .40
Safex	lb.		@
SPDX	lb.	.70	@ .75
Super-sulphur No. 1	lb.		@
No. 2	lb.		@
Tensilac 39	lb.	.40	@ .42½
Thermlo F	lb.		@
Thiocarbanilid	lb.	.20	@ .22
TMTT	lb.	3.00	@ 3.25
Trimene	lb.		@
base	lb.		@
Triphenyl guanidine	lb.	.58	@ .60
Tuads	lb.		@
Ulto	lb.	3.00	@
ZBX	lb.		@
Zimate	lb.		@
Acids			
Acetic 28% (bbls.)	100 lbs.	2.40	@ 2.65
glacial (carboys)	100 lbs.	8.75	@ 9.10
Sulphuric, 66°	ton	15.50	@
Age Resisters			
Age-Rite Gel	lb.		@
powder	lb.		@
resin	lb.		@
white	lb.		@
Albasan	lb.		@
Antox	lb.		@
Stabilite	lb.	$0.57	@ $0.62
Alba	lb.	.70	@ .75
VGB	lb.		@
Zalba	lb.		@
Antisun Materials			
Heliozone	lb.		@
Sunproof	lb.		@
Binders, Fibrous			
Cotton flock, dark	lb.	.08½	@ .10
dyed	lb.	.50	@ .85
white	lb.	.11	@ .16
Colors			
BLACK			
Bone, powdered	lb.	.05½	@ .15
Carbon (see Reenforcers)			
Drop (bbls.)	lb.	.05½	@ .17
Lampblack (commercial)	lb.	.07	@ .08
BLUE			
Blue toners	lb.	.60	@ 3.85
Brilliant blue	lb.	3.50	@
Prussian	lb.	.35	@ .37
Ultramarine	lb.	.06	@ .30
BROWN			
Iron oxide	lb.		@
Mapico	lb.	.17	@
Sienna, Italian, raw, powdered	lb.	.04½	@ .11
GREEN			
Brilliant green	lb.	3.50	@
Chrome, light	lb.	.23	@ .25½
medium	lb.	.26	@ .27½
Chromium oxide	lb.	.25	@ .32
Dark green	lb.	1.30	@
Green toners	lb.	1.00	@ 3.60
Light green	lb.	.70	@
ORANGE			
Cadmium sulphide	lb.	.65	@ .75
Orange lake	lb.	.50	@
Orange toners	lb.	1.60	@
ORCHID			
Orchid toners	lb.	1.05	@ 1.75
PINK			
Pink toners	lb.	1.00	@ 1.80
PURPLE			
Permanent purple	lb.	1.80	@
Purple toners	lb.	.60	@ 1.90
RED			
Antimony			
Crimson, R. M. P. No. 3	lb.	.48	@
Sulphur free	lb.	.52	@
7-A	lb.	.35	@
Z-2	lb.	.20	@
Cadmium	lb.		@
Chinese red	lb.	.85	@
Crimson red	lb.	.85	@
Iron Oxides			
FER-OX brand	lb.		@
Rub-er-red	lb.	.08¼	@
Mapico	lb.	.09	@
Medium red	lb.	.08	@
Red toners	lb.	.95	@ 2.75
Scarlet red	lb.	1.50	@
Spanish red oxide	lb.	.03	@
WHITE			
Lithopone	lb.	$0.04½	@ $0.05
Albalith	lb.	.04½	@ .05
Cryptone No. 19	lb.	.06½	@ .07
Grasselli (50 lb. bags)	lb.	.04½	@ .04¾
(400 lb. bbls.)	lb.	.04¼	@ .05
Titanium oxide, pure	lb.	.20	@
Titanox "B"	lb.	.06½	@ .07
"C"	lb.	.07	@ .07½
Zinc Oxide			
Black label (lead free) c. l., bags	lb.	.06¼	@
Green label (lead free) c. l., bags	lb.	.06½	@
Green seal	lb.	.10¾	@ .10¾
Green seal, Anaconda	lb.	.10¼	@ .10⅞
Kadox, black label	lb.	.10¼	@ .10⅞
blue label	lb.	.09¾	@ .09⅞
red label	lb.	.08	@ .08½
Red label (lead free) c. l., bags	lb.	.06½	@
Red seal	lb.	.09¾	@ .09⅞
Red seal, Anaconda	lb.	.09¾	@ .09⅞
Special	lb.	.07	@ .07½
White seal (bbls.)	lb.	.11¾	@ .11⅞
White seal, Anaconda	lb.	.11¾	@ .11⅞
XX green	lb.	.07	@ .07½
XX red	lb.	.06¾	@ .07
Zinc sulphide (bbls.)	lb.	.13	@ .13½
YELLOW			
Cadmium sulphide	lb.		@
Chrome	lb.	.16	@
Lemon yellow	lb.	1.50	@
Mapico	lb.	.12	@
Ochre, domestic	lb.	.01¾	@ .02¾
Yellow toners	lb.	2.50	@
Deodorant			
Rodo	lb.		@
Factice—See Rubber Substitutes			
Fillers, Inert			
Asbestine	ton	13.40	@ 13.50
Barytes, white, spot	ton	33.00	@
off color, spot	ton	25.00	@
Foam "A" (f.o.b. St. Louis)	ton	23.00	@
Blanc fixe, dry, precip., c. l.	ton	75.00	@ 77.50
pulp	ton	42.50	@ 45.00
Infusorial earth	ton	45.00	@ 80.00
Suprex white, extra light	ton	70.00	@ 80.00
Whiting			@
Chalk, imported	100 lbs.	.85	@ 1.25
Domestic	100 lbs.	1.00	@
Paris white, English cliffstone	100 lbs.	1.45	@ 3.50
Quaker	ton		@
Sussex	ton		@
Witco (l. c. l.) (f.o.b. New York)	ton	20.00	@
Fillers for Pliability			
Flex	lb.		@
Fumonex	lb.	.02½	@ .06
P-33	lb.		@
Thermax	lb.		@
Velvetex	lb.	.02	@ .05

Finishes			
Mica, amber	lb.	$0.04½	@
Starch, corn, pwd.	100 lbs.	2.52	@ 2.72
potato	lb.	.05½	@ .06
Talc, dusting	lb.	.01½	@
French	ton	18.00	@22.00
Italian	lb.	.02½	@ .03½
Pyrax A	ton		@
Inflating Material			
Sponge paste	lb.	.30	@
Mineral Rubber			
Genasco (tact'y)	ton	40.00	@42.00
Gilsonite (tact'y)	ton	37.14	@39.65
Granulated M. R.	ton		@
Hydrocarbon, hard	ton		@
Parmr Grade 1	ton	23.00	@28.00
Grade 2	ton	23.00	@28.00
Mold Lubricants			
Sericite	lb.		@
Soapbark (cut)	lb.	.07½	@ .08
Soapstone	lb.	.01¼	@
Oils			
Castor	lb.	.12½	@
Poppy seed oil	gal.	1.70	@
Red oil, distilled	lb.	.07½	@ .07⅞
Protective Colloids			
Bentonite (dispersion clay)	lb.	.02½	@ .03
Casein, domestic	lb.	.07½	@
Reenforcers			
Aluminum flake (sacks, c. l.)	ton	21.85	@
(sacks, l.c.l.)	ton	24.50	@
Carbon Black			
Aerfloted arrow	lb.	.03½	@ .07
Cabot's certified black	lb.	.03	@
Century (works, La., c. l.)	100 lbs.	3.00	@
Disperso (works, La., c. l.)	100 lbs.	3.00	@
Dixie brand	lb.	.03½	@ .07½
Elastex	lb.	.03	@ .07
Excello	lb.	.04	@
Gastex (f. o. b. fact'y)			
contracts	lb.	.02½	@
carload	lb.	.02½	@
less carload	lb.	.03¼	@ .04¼
Kosmos brand	lb.	.03½	@ .07½
Micronex	lb.	.03½	@ .07½
Ordinary (compressed or uncompressed)	lb.	.03	@ .07
Supreme	lb.	.03	@
Clays			
Bento	lb.	.03	@
Blue Ridge, dark	ton		@
Dixie	ton		@
Dusto	lb.	.08	@
Langford	ton		@
Lexo (works)	ton		@
Par	ton		@
Perfection	ton	20.00	@
Suprex No. 1	ton	8.00	@
No. 2, dark	ton	6.50	@
Glue, high grade	lb.	.20	@ .25
Rubber Substitutes or Factice			
Amberex	lb.	.15	@
Black	lb.	.07	@ .09
Brown	lb.	.07	@ .11
White	lb.	.08	@ .14
Softeners			
Degras	lb.	.03½	@ .04½
Fluxol	ton	18.00	@80.00
Palm oil (Witco)	lb.	.07½	@
Para-flux	gal.	.15	@
Petrolatum, snow white	lb.	.06½	@ .07
Rosin oil, compounded	gal.	.35	@
Rubberseed, drums	lb.	.07¾	@
Rubtack	lb.	.10	@
Tonox	lb.		@
Witco No. 20	gal.	.08	@
Solvents			
Benzol (90% drums)	gal.	.25	@
Carbon bisulphide (drums)	lb.	.05½	@ .12
tetrachloride	lb.	.06¼	@ .07
Dip-Sol	gal.		@
Dryolene, No. 9	gal.		@
Petrobenzol	gal.		@
Rub-Sol	gal.		@
Solvent naphtha (tanks)	gal.	.26	@
Stod-Sol	gal.		@
Troluoil	gal.		@
Turpentine, dest distilled	gal.	.33	@ .36
Stabilizers			
Laurex, ton lots	lb.		@
Stearates			
Aluminum	lb.		@
Calcium	lb.		@
Magnesium	lb.	.26	@
Zinc	lb.	.26	@
Stearex B	lb.	.08	@ .12
Stearex flake	lb.	.09	@ .13
Stearic acid, dbl. pres'd.	lb.	.08	@ .08½
Vulcanizing Ingredients			
Sulphur			
Sulphur chloride, drums	lb.	.06	@
Superfine flour, 99½% pure (210 lb. bbls.)	100 lbs.	2.58	@ 3.08
(100 lb. bags)	100 lbs.	2.23	@ 2.73
Velvet flour, refined (240 lb. bbls.)	100 lbs.	3.18	@ 3.68
(150 lb. bags)	100 lbs.	2.83	@ 3.33
Tellоy	lb.		@
Vandex	lb.		@

(See also Colors—Antimony)

Interesting Letters

Rubber Structure

To the Editor: The article, "Comeback of Two-Phase Rubber," in the November issue of India Rubber World not only misinterpreted the results of some of my research work but contained deductions liable to confuse readers not familiar with recent researches on rubber structure. For that reason I submit the following brief chronological summary of rubber structure research giving the most important developments.

1892, R. Fessenden. Rubber a 2-phase system (purely theoretical).

1911, T. Petch. First drawings of pear-shaped latex particles.

1919, W. Bobilioff. Detailed description of latex particle shape.

1923, Lunn. Discusses that the Fessenden model is actually existent in the single latex particle and based on this assumption he develops a rubber structure theory.

1923, Ducleaux. Two-phase theory assuming a hydrocarbon of at least 2 different degrees of polymerization.

1924, Hauser, 1925, Freundlich-Hauser. Detailed report on microphotographic and microdissection work on natural latex on the plantation. A schematic picture of the heterogeneous structure of a latex particle is given, thereby proving for the first time experimentally that the Fessenden assumption was correct. The picture contained in the note referred to is practically a copy of Hauser's schematic drawing of the latex particle structure as published in 1924-25.

1913, Caspari, 1925, Feuchter, 1926, Pummerer. Chemically divide rubber into 2 fractions by their difference in solubility. (Sol- and Gel- or α- and β-rubber.)

1925, J. R. Katz. First to publish that rubber, when stretched, yields an X-ray fiber diagram.

1925, 1926, Hauser-Mark. First systematic X-ray research of rubber. First structured theory based on X-ray work (Hauser-Mark theory). Explanation of elasticity based on the assumption of a hydrocarbon of different degrees of polymerization.

1928, Bary-Hauser. Rubber consists of an α- and β-modification.

1929, Meyer-Mark. Main valency chain theory.

1929, Fikentscher. Main valency chain spiral model.

1929, Hauser (*Ind. Eng. Chem.* 21, 249, 1929). Rubber structure research summary. Explanation of differences between latex structure and structure of the hydrocarbon. In both cases a 2-phase structure is assumed.

1929, Whitby. Chemical results proving rubber to be at least 2-phase.

1931, Acken-Davey. Further X-ray contributions to the 2-phase theory.

We must distinguish between the molecular structure of the hydrocarbon and the microscopically visible structure the hydrocarbon builds up in an individual latex particle. It would be as silly to compare them as to compare the structure of an individual brick with the construction of a building. Hauser has maintained throughout that the rubber hydrocarbon must be present in a rubber gel in at least 2 different degrees of polymerization. The spiral chain represents the higher polymer; therefore the statement that the 2-phase system received a jolt through Hauser is absolutely wrong; just the contrary would be right.

The individual latex particle is built up from millions of rubber molecules or molecular chains. It is assumed that the degree of polymerization, in other words, the amount of long chains increases toward the outside. This results in a structure schematically shown by Hauser in 1924 and now revived by the author of the note referred to. This structure, however, is unique for a single particle of Hevea latex and has nothing to do with the structure of the actual rubber hydrocarbon.

Prof. E. A. Hauser.

Frankfurt, Germany, December 3, 1931.

Tire Prices Cut

The past month saw prices of tires and tubes cut from 10 to 19 per cent to bring them to the lowest levels in their history. Although this policy is widely denounced by and extremely unpopular with executives in the rubber industry, the following concerns made reductions: The Firestone Tire & Rubber Co., Akron, O.; The Fisk Rubber Co., Chicopee Falls, Mass.; The B. F. Goodrich Co. and The Goodyear Tire & Rubber Co., both of Akron; Lee Tire & Rubber Co., Conshohocken, Pa.; The Master Tire & Rubber Co., controlling The Falls Rubber Co., Cuyahoga Falls, Cooper Corp. and The Giant Tire & Rubber Co., both of Findlay, all in O.; Mohawk Rubber Co., Akron; Pennsylvania Rubber Co., Jeannette, Pa.; Seiberling Rubber Co., Akron; and Standard Oil Co. of Indiana. Although no definite announcement has been forthcoming from The General Tire & Rubber Co., Akron; India Tire & Rubber Co., Mogadore, O.; Kelly-Springfield Tire Co. and United States Rubber Co., both of New York, N. Y., rumors state that their dealers have received revised schedules.

The price reductions affect only standard-grade tires and are said to be made possible because of lower prices of raw materials. A 19 per cent cut on the wholesale price of truck tires was also made, partly to eliminate former methods of giving discounts. Before quoting on second-grade tires manufacturers awaited winter price catalogs of the prominent mail order houses.

These came toward the end of the month. Sears, Roebuck & Co., Chicago, Ill., lowered its automobile tire prices 5 to 15 per cent, according to size. Truck tires were reduced 12 to 20 per cent. Montgomery Ward & Co. cut prices on its passenger car tires and inner tubes 5 to 10 per cent effective December 26. In addition the company is introducing a 6-ply tire at the usual price of the 4-ply tire.

Cotton and Fabrics

NOT satisfied with one of the largest crops of raw cotton in the history of the industry, manufacturers of cloth added to the maladjustment by overproduction. The census figures for November tell the story. Sales were 96.9 per cent of production, and shipments, 92.4 per cent, while stocks on hand increased 6.9 per cent.

This trend was spotted early, and pressure was brought to bear on the recalcitrant manufacturers producing excessively. It is believed that many mills will close down longer than usual during the Christmas and New Year holidays, and this action may help to correct a condition that should never be permitted to exist.

Japan's abandonment of the gold standard caused much conjecture in the trade. Some felt that she would cut down her purchases of American cotton, others that she would again take over the business that had slipped to American and British competitors recently.

Cotton during the past month has also been influenced a great deal by the stock and the grain markets, with traders watching political developments both here and abroad. The statements of the prominent financiers before the Senate Investigating Committee to the effect that the banks had few German securities but had passed most of them on to the public was regarded favorably.

The outlook for cotton is not clear. The Government is said to be willing to extend further aid to cotton farmers if they restrict acreage, but it seems now that the agitation for a 50 per cent cut next year in the crop was a bit overenthusiastic; and the only concrete action will probably be taken by bankers who loan money on the crops.

Week ended November 28. Trade interests were credited with stopping the 12,000 December notices, and the lack of southern selling together with a wave of buying sent prices up ¼-cent Monday. Credit for the rise was also given to the fact that The Southwide Uniform Cotton Control Conference had adopted the Texas curtailment plan for a 50 per cent reduction in next year's acreage.

But prior to the Thanksgiving Day holiday the market lost its gains due to sympathy with the stock and the wheat markets, both of which sold off. The South is credited with holding much cotton from the market, and selling from that source is limited.

Interesting revelations were made at the Senate committee's hearings as to the activities of the Federal Farm Board. The losses of the board, based on prices at October 31, totaled $177,000,000 on paper. A statement by James C. Stone, chairman of the Farm Board disclosed the fact that on October 31 the Board held 1,310,789 bales of cotton, costing 18 cents a pound, or $120,000,000. October 31 quotations gave this cotton a value of $45,000,000 approximately, or a loss of about $75,000,000. Although Chairman Stone said these were only paper losses and that the cotton might be held for several years before being sold, the fact remains that carrying charges are constantly accumulating, and each year passed increases the cost of the cotton.

After reaching the highest point since last August, cotton cloth production is expected to decline this week because of the holiday. Prices are being cut, but sales are falling off after October's active trading.

Prices at the close of November 28 were:

Position	High	Low	Close	Previous Close
Dec.	6.06	5.96	6.06	5.99
Jan.	6.11	6.01	6.11	6.06/07
Mar.	6.26	6.18	6.25/26	6.22/23
May	6.43	6.35	6.40/43	6.41
July	6.61	6.54	6.60/61	6.59/60
Oct.	6.86	6.81	6.85/86	6.84/86

Week ended December 5. In a market that fluctuated only a few points up and down, cotton prices slightly improved for the week. The stock market was responsible for much of the change in price. Toward the week-end, when stocks weakened, the cotton market followed suit. Earlier in the week heavy sales reported by the house operating for the cooperatives pushed the market down from 7 to 12 points. Sterling has been sliding off also, but the gain which this condition caused in Liverpool was erased under selling pressure.

The market is waiting for the next cotton crop report by the Government, due next Tuesday. Exchange members and

COTTON BEAR POINTS

1. The 1931 crop was put at 16,913,000 bales as of December 1, against 13,931,597 in 1930.
2. Forwardings to mills of the world to December 15 were 3,610,000 bales, against 3,702,000 in 1930 and 3,921,000 bales in 1929.
3. Production of carded cotton cloth increased 1.9 per cent in November; sales were 96.9 per cent of production; shipments, 92.4 per cent of production; stocks on hand increased 6.9 per cent; unfilled orders gained 3 per cent.
4. Cotton ginnings prior to December 15 were put at 15,358,405 running bales, against 13,259,413 last year.
5. Cotton cloth production in American cotton mills during November was 494,365,000 sq. yds., against 479,351,000 in November, 1930.
6. Japan's abandonment of the gold standard may put her manufacturing cost on a par with Britain's and cut into American business.
7. Doubt exists as to whether the South will curtail acreage in 1932.
8. Cotton in public storage and compresses totaled 10,695,797 bales on November 30, compared with 9,449,987 on October 31 and 8,397,549 on November 30, 1930.
9. Cotton spindles active during November numbered 24,860,684, compared with 25,188,112 in October and 25,796,748 in November, 1930.

COTTON BULL POINTS

1. India's crop is estimated at 4,096,000 running bales, against 4,750,000 last year. The Egyptian crop is put at 1,330,000 bales, against 1,693,000 last season.
2. Efforts to curtail overproduction of cotton cloth are bearing fruit.
3. A holding movement in the South has kept about half the crop off the market.
4. The cotton spinning industry operated at 85.8 per cent capacity in November, against 85.1 per cent in October and 80.1 per cent in November, 1930.
5. Cotton consumed in November was 428,870 bales of lint, against 462,025 in October and 415,315 in November, 1930.
6. Exports for November were 1,070,643 bales of lint, against 1,014,180 in October and 907,649 in November, 1930.
7. Stocks of cotton goods in the hands of retailers are believed small.

New York Quotations

December 26, 1931

Drills

38-inch 2.00-yard	yd.	$0.09 @
40-inch 3.47-yard		.05 5/16 @
50-inch 1.52-yard		.12½ @
52-inch 1.90-yard		.10 @
52-inch 2.20-yard		.08 5/16 @
52-inch 1.85-yard		.10¼ @

Ducks

38-inch 2.00-yard D. F.	yd.	.09 @
40-inch 1.45-yard S. F.		.13 @
72-inch 1.05-yard D. F.		.20 @
72-inch 16.66-ounce		.21 @
72-inch 17.21-ounce		.22 @

MECHANICAL

Hose and belting	lb.	.19 @

TENNIS

52-inch 1.35-yard	yd.	.14 @

Hollands

RED SEAL

36-inch	yd.	.13½ @
40-inch		.14 @
50-inch		.20 @

GOLD SEAL

40-inch, No. 70	yd.	.16 @

Osnaburgs

40-inch 2.35-yard	yd.	.07 7/8 @
40-inch 2.48-yard		.07¼ @
40-inch 3.00-yard		.06 3/4 @
40-inch 10-oz. part waste		.08¼ @
40-inch 7-oz.		.06¼ @
37-inch 2.42-yard		.07 5/8 @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yd.	.08¼ @
Bombazine 60 x 48		.07¼ @
Plaids 60 x 48		.09¼ @
Plaids 48 x 48		.07¼ @
Surface prints 64 x 60		.10¼ @
Surface prints 60 x 48		.09¼ @
Print cloth, 38½-in., 64 x 60		.03¼ @
Print cloth, 38½-in., 60 x 48		.02¼ @

SHEETINGS, 40-INCH

48 x 48, 2.50-yard	yd.	$0.05 5/8 @
48 x 48, 2.85-yard		.05 @
64 x 68, 3.15-yard		.05 5/8 @
56 x 60, 3.60-yard		.04¾ @
44 x 48, 3.75-yard		.04 @
44 x 40, 4.25-yard		.03¾ @

SHEETINGS, 36-INCH

48 x 48, 5.00-yard	yd.	.03 1/8 @
44 x 40, 6.15-yard		.03 @

Tire Fabrics

BUILDER

17¼ oz. 60" 23/11 ply Karded peeler	lb.	.22½ @
17¼ oz. 60" 10/5 ply Karded peeler	lb.	.20½ @

CHAFER

14 oz. 60" 20/8 ply Karded peeler	lb.	.22½ @
12 oz. 60" 10/4 ply Karded peeler	lb.	.18½ @
9¼ oz. 60" 20/4 ply Karded peeler	lb.	.24½ @
9¼ oz. 60" 10/2 ply Karded peeler	lb.	.20½ @

CORD FABRICS

23/3/3 Karded peeler, 1 3/32" cotton	lb.	.22½ @
23/4/3 Karded peeler, 1 1/32" cotton	lb.	.24½ @
15/3/3 Karded peeler, 1 1/32" cotton	lb.	.20½ @
13/3/3 Karded peeler, 1 1/32" cotton	lb.	.19½ @
7/2/2 Karded peeler, 1 1/32" cotton	lb.	.19½ @
23/5/3 Karded peeler, 1¼" cotton	lb.	.27½ @
23/5/3 Karded Egyptian, Egyptian uppers, cotton	lb.	.34¼ @
23/5/3 Combed Egyptian	lb.	.40½ @

LENO BREAKER

8¼ oz. and 10¼ oz. 60" Karded peeler	lb.	.22½ @

private traders estimated the size of the crop; the average of the exchange estimates was 17,214,000 bales, and that from private sources, 17,113,000 bales. This compares with last month's figure of 16,297,000 bales. Private ginning estimates averaged 15,166,000 bales, against 14,210,000 shown in the last census report.

The holding movement in the South seems well sustained; so basic prices are holding firm. It has led to the belief that preholiday liquidation will be inconsequential.

Cotton cloth production in spite of the Thanksgiving holiday showed less than a seasonal decline last week, and the *Times'* index now stands at the highest point it has reached this year. It was 97.2 for the week ended November 28, against 93.5 for the preceding week, and 76.6 for the same week last year.

Prices of cloth are growing weaker. November and December are unseasonable months, and the New York Cotton Exchange Service forecasted that sales for November will probably be below production.

Exports from the United States so far this season have been 2,994,000 bales, against 3,368,000 last year, and 3,486,000 in 1929. Forwardings to the mills of the world have been 4,637,000 bales, against 4,124,000 last year, and 5,437,000, 2 years ago. The world's visible supply is 9,182,000 bales, against 8,131,000 last year, and 6,152,000 in 1929, according to the Cotton Exchange.

Prices at the close of December 5 were:

Position	High	Low	Close	Previous Close
Dec.	6.02	5.96	5.99/6.00	5.98/99
Jan.	6.08	6.01	6.05/06	6.05/06
Mar.	6.27	6.18	6.23	6.22/24
May	6.43	6.37	6.41	6.40/41
July	6.60	6.53	6.57	6.57
Oct.	6.87	6.80	6.83/84	6.84

Week ended December 12. The Government's final crop estimate was 16,918,000 bales of cotton as of December 1. This was only 15,000 bales above the November 1 estimate, but almost 300,000 bales lower than the average expected by exchange members.

Ginnings, however, were more than 2,000,000 bales ahead of last year's. At December 1, 15,023,451 bales of the 1931 crop had been ginned, compared with 12,837,099 bales during the same period in 1930 and 12,853,166 in 1929. The yield per acre was 200.1 pounds, the highest since 1914, and far above the 1930 yield, which was only 147.7 pounds per acre.

An early advance of about 15 points was scored on the strength of the report, but failing to uncover a short interest and in sympathy with the weakness in securities, the market closed the day from 2 to 6 points off. Trade buying lifted the market slightly in the rest of the week, but the market turned a bit softer on Saturday when prices dropped 1 to 6 points with stocks.

Overproduction of cotton cloth is still a worrisome factor in the market, and the announcement that the larger printcloth mills in the South would close a full week during the holidays if other mills kept the agreement was looked upon as a necessary step. It has also been proposed that the mills close one week in each month, and it only depends on the cooperation of mill

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
Nov. 28	6.20
Dec. 5	6.15
Dec. 12	6.10
Dec. 19	6.25
Dec. 26	6.33

owners to go into effect. If these agreements are carried out, prices of cloth should be much firmer; in fact, some fair-sized orders were put through in the last week or so, and prices held steady in the face of pressure from buyers.

Exports are slowly climbing to last year's figures. At present they are about 150,000 bales behind last year. The total so far has been 3,340,000 bales, with the Orient showing the greatest gain in receipts.

Foreign manufacturers are finding it hard to compete against England. A cable from Berlin to the New York News Bureau states:

"Textile mills in the Saxony district will be forced to discharge about 18,000 employes at the end of this week as a result of falling off in business because of the British duties recently imposed. It is estimated that these duties will entail a loss of about 50,000,000 marks annually to Saxony mills."

Prices at the close of December 12 were:

Position	High	Low	Close	Previous Close
Dec.	6.02	5.96	5.97	6.04
Jan.	6.07	5.99	6.00	6.09
Mar.	6.26	6.18	6.18	6.27/28
May	6.44	6.36	6.39	6.44/46
July	6.62	6.54	6.57	6.62/63
Oct.	6.89	6.81	6.82/83	6.91

Week ended December 19. Cotton scored a gain of about ¼-cent during the week, mostly in response to outside influences. The advances in bonds and stocks seemed to engender confidence in the cotton market, bringing out a wave of buying which, in the face of the southern holding movement, carried prices up from 15 to 17 points on Friday alone.

Japan's abandonment of the gold standard also led some traders to believe that inflation might result in commodity markets. Exports to Japan so far this season are far in excess of those last year. It was also said that the heavy rains lately had damaged much cotton still in the fields. Considerable switching occurred in the market in anticipation of January notice day, and a good deal of evening up before the holidays.

The Census Bureau announced that consumption of cotton in November was 428,870 bales of lint and 52,687 bales of linters, compared with 462,025 of lint and 61,243 of linters in October this year and 415,315 of lint and 54,175 of linters in November, 1930.

Exports for November totaled 1,070,643 bales of lint and 10,358 bales of linters, compared with 1,014,180 and 9,529 for October, 1931, and 907,649 and 12,604 for November, 1930.

The cotton spinning industry was reported to have operated at 85.8 per cent capacity on a single shift basis during November, against 85.1 per cent in October and 80.1 per cent in November last year.

Production of carded cotton cloths during November was 231,446,000 yds., against sales of only 224,207,000 yds. Shipments were 92.4 per cent of production; stocks on hand increased 6.9 per cent; and unfilled orders gained 3 per cent.

The holding movement is pointed out by the New York Cotton Exchange Service, which shows that up to December 3 only 8,652,000 bales moved into sight against 9,218,000 bales a year ago. About 8,623,000 bales of ginned cotton and 1,498,000 bales of unginned or unpicked cotton have yet to come on the market.

Prices at the close of December 19 were:

Position	High	Low	Close	Previous Close
Dec.	6.26	6.23	6.24/25	6.20
Jan.	6.31	6.25	6.26	6.24/25
Mar.	6.48	6.42	6.42/43	6.42/43
May	6.68	6.60	6.60/61	6.61/62
July	6.85	6.79	6.79/80	6.77
Oct.	7.13	7.05	7.07/08	7.05/06

Week ended December 26. For the most part the market was sluggish in anticipation of the holidays; and little evening up occurred in expectation of January notice day because the number of notices was expected to be small. Cotton dropped from 8 to 12 points on Monday, but the drop was due to weakness in stocks and grains.

The ginning figures released by the Census Bureau showed that little cotton had been ginned from December 1 to 13 because of heavy rains, but the aggregate was far ahead of last year. Prior to December 15 ginnings amounted to 15,358,405 running bales, against 13,259,413 bales last year.

The Association of Cotton Textile Merchants reported that production of cotton cloth for November totaled 494,300,000 sq. yds. of cotton cloth, against 479,300,000 in November last year.

Prices at the close of December 26 were:

Position	High	Low	Close	Previous Close
Jan.	6.27	6.17	6.26/27	6.15
Mar.	6.45	6.33	6.44/45	6.30/31
May	6.63	6.49	6.58/63	6.47/49
July	6.82	6.67	6.80/82	6.65/66
Oct.	7.04	6.91	7.03/04	6.92
Dec.	7.14	7.06	7.19	....

Cotton Fabrics

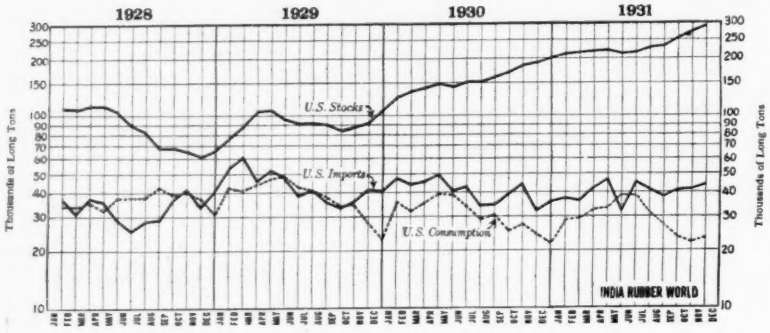
DUCKS, DRILLS, AND OSNABURGS. Conditions of the market for these fabrics are essentially unchanged from those of one month ago. The market is somewhat stagnant and influenced by conditions in the raw cotton market. It is assumed that fair activity will follow the close of the inventory period but will probably consist chiefly of fill-in orders until promise of future business revival becomes more clearly defined.

RAINCOAT FABRICS. The raincoat business is very quiet at present because it is between seasons; so the only goods manufacturers are buying are sample pieces for next Spring's trade.

SHEETING. As usual at this time of the year trade in sheetings is very inactive because of the approach of inventory taking by manufacturers. For the past few weeks print cloths in particular have shown weakness; while sheetings have remained comparatively firm and moderately active.

TIRE FABRICS. In the tire fabric trade buying in large quantities for deliveries during 1932 occurred during December.

Imports, Consumption, and Stocks



United States Stocks, Imports, and Consumption

CONSUMPTION of crude rubber by manufacturers in the United States for November increased 3.0 per cent as compared with October and a usual seasonal decline of 8.8 per cent. November consumption is estimated to be 22,943 long tons as compared with 22,277 long tons for October, and 23,479 long tons for November, 1930, according to the R. M. A.

Imports of crude rubber for November amounted to 43,733 long tons, an increase of 5.6 per cent over the October figure of 41,395 long tons, and 37.7 per cent above November, 1930.

The Association estimates total domestic stocks of crude rubber on hand November 30 at 292,493 long tons, an increase of 7.0 per cent over October and 54.0 per cent over November 30, 1930.

Crude rubber afloat for the United States ports on November 30 is estimated at 77,443 long tons as against 68,427 long tons on October 31 and 52,538 long tons on November 30, 1930.

London and Liverpool Stocks

Week Ended	Tons	
	London	Liverpool
Nov. 28	73,207	56,366
Dec. 5	72,904	56,901
Dec. 12	72,785	57,157
Dec. 19	71,400	57,116
Dec. 26	70,043	56,908

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

Number	Commodity	City and Country
†54,261	Tires	Prague, Czechoslovakia
*54,262	Hot water bottles	Liverpool, England
†54,288	Golf balls	Montreal, Canada
†54,314	Tire repair materials	Unterweissbach, Germany
*54,348	Garden hose	Bilthoven, Netherlands
†54,352	Balls	Montreal, Canada
†54,362	Tires	Hamburg, Germany
†54,408	Rubberized cotton cloth	Tallinn, Estonia
†54,409	Raincoats, rubber garments, and toys	Bage, Brazil
*†54,428	Bathing caps and shoes	Medan, Sumatra
†54,465	Rubber cloth	Turin, Italy
†54,488	Jar rings	Toronto, Canada
‡54,489	Chair cushion sponge rubber fillers	Vancouver, Canada
*54,493	Rubber bands	Ringe, Denmark
*54,584	Aprons and household articles	Breslau, Germany
†54,598	Ribbons and buttons	Stettin, Germany
*54,599	Corset cords	Boras, Sweden
†54,604	Transmission belting	Rome, Italy
†54,620	Rubber sundries	Sao Paulo, Brazil
*†54,629	Soles and heels	Amsterdam, Netherlands
†54,630	Tennis balls	Sao Paulo, Brazil
*54,689	Fire hose	Rio de Janeiro, Brazil
*54,690	Heels	Addis Ababa, Ethiopia
*†54,691	Thread, rubber bands, and transmission and transport belts	Riga, Latvia
†54,698	Bathing caps, tennis balls, and sport goods	La Guaira, Venezuela
*†54,699	Surgical goods	Poznan, Poland
†54,773	Sport goods	Johannesburg, South Africa
‡54,777	Raincoats	Oslo, Norway
†54,828	Boots and overshoes	Milan, Italy

*Purchase. †Agency. *†Purchase and agency. ‡Either.

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand† Tons	U. S. Stocks Afloat† Tons	United Kingdom Stocks†‡ Tons	Singapore and Penang Stocks, Etc.†‡ Tons	World Production (Net Exports)‡ Tons	World Consumption Estimated‡ Tons	World Stocks—U. S. A., U. K., Singapore, and Penang†‡ Tons
1926	411,962	358,415	72,510	51,238	51,320	26,443	614,778	533,915	149,026
1927	431,807	372,528	100,130	47,938	66,261	25,798	605,196	589,128	193,146
1928	446,421	442,227	66,166	68,764	22,691	32,905	649,674	667,027	122,828
1929	561,454	466,475	105,138	62,389	73,276	35,548	863,410	785,475	228,572
1930	488,343	375,980	200,998	56,035	118,297	45,179	821,815	684,993	366,034
1931									
January	37,098	28,557	209,487	56,188	124,336	48,306	65,714	49,620	382,129
February	36,645	28,797	212,834	63,680	126,874	48,164	65,719	59,970	387,872
March	40,338	32,788	218,317	63,133	133,013	48,300	71,218	59,980	399,630
April	46,648	33,321	228,383	56,700	138,144	44,857	63,395	51,200	411,384
May	31,720	37,817	220,799	73,564	138,945	43,212	68,628	63,190	402,936
June	45,776	37,916	225,536	69,421	136,233	46,573	62,090	64,050	409,132
July	41,004	31,937	234,822	66,873	135,916	50,021	66,600	58,240	420,759
August	38,370	27,586	240,817	61,469	136,956	48,010	65,392	54,750	425,782
September	40,505	23,638	254,324	62,420	134,556	46,068	66,529	57,200	434,949
October	41,395	22,277	273,456	68,427	133,494	51,122	71,511	50,490	458,134
November	43,733	22,943	292,493	77,443	.....	.....	.....	.....	.....

*Including liquid latex, but not guayule.
†Stocks on hand the last of the month or year.
‡W. H. Rickinson & Son's figures.

London Stocks, October, 1931

London	Landed Tons	Delivered Tons	Stocks, October 31 1931 Tons	1930 Tons	1929 Tons
Plantation	3,581	6,491	76,717	77,543	47,661
Other grades	2	2	35	54	52
Liverpool					
Plantation	*4,846	*2,716	*56,742	*38,848	*13,903
Total tons, London and Liverpool	8,429	9,209	133,494	116,445	61,616

* Official returns from the recognized public warehouses.

Low and High New York Spot Prices

Plantations	December 1931*	1930	1929
Thin latex crepe	$0.04⅝@$0.05 5/16	$0.08⅛@$0.09⅞	$0.16¼@$0.17⅜
Smoked sheet, ribbed	.04 5/16@ .05 5/16	.08¾@ .09⅝	.15½@ .16½
Paras			
Upriver fine	.05½@ .05¾	.12¾@	.15¾@ .16½
Upriver coarse	Nominal	.07½@ .08	.08¼@ .08¾
Upper caucho ball	Nominal	.07½@ .08	.08 @ .08¾

* Figured to December 26, 1931.

Rubber Questionnaire

Third Quarter, 1931*

	Long Tons			
Reclaimed Rubber	Inventory at End of Quarter	Production	Shipments	Consumption
Reclaimers solely (5)	5,877	10,425	10,224	78
Manufacturers who also reclaim (16)	5,405	19,031	6,438	14,542
Other manufacturers (79)	3,334	.....	.....	11,387
Totals	14,616	29,456	16,662	26,007

	Long Tons		
Scrap Rubber	Inventory	Consumption	Due on Contract
Reclaimers solely (5)	24,100	14,150	8,104
Manufacturers who also reclaim (16)	36,104	22,809	15,673
Other manufacturers (10)	202	.....	.....
Totals	60,406	36,959	23,777

Tons of Rubber Consumed in Rubber Products, and Total Sales Value of Shipments

Products	Crude Rubber Consumed Long Tons	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Sundries		
Automobile and motor truck pneumatic casings	49,444	$98,925,000
Automobile and motor truck pneumatic tubes	9,809	14,669,000
Motorcycle tires (casings and tubes)	73	201,000
Bicycle tires (single tubes, casings, and tubes)	248	670,000
Airplane casings and tubes	29	111,000
Solid and cushion tires	671	1,493,000
All other solid tires	82	229,000
Tire sundries and repair materials	927	3,344,000
Totals	61,283	$119,642,000
Other Rubber Products		
Mechanical rubber goods	5,253	$17,415,000
Boots and shoes	3,146	13,763,000
Insulated wire and insulating compounds	885	†4,984,000
Druggists' sundries, medical and surgical rubber goods	423	1,955,000
Stationers' rubber goods	284	447,000
Bathing apparel	162	523,000
Rubber clothing	263	1,118,000
Automobile fabrics	164	719,000
Other rubberized fabrics	758	2,375,000
Hard rubber goods	322	†1,603,000
Heels and soles	2,138	4,836,000
Rubber flooring	333	722,000
Sporting goods, toys, and novelties	451	1,915,000
Miscellaneous, not included in any of the above items	1,076	2,951,000
Totals	15,658	$55,326,000
Grand totals—all products	76,941	$174,968,000

Inventory of Rubber in the United States and Afloat

	Long Tons			
On Hand	Plantation	Para	All Others	Totals
Manufacturers	169,072	2,034	190	171,296
Importers and dealers	42,232	1,004	289	43,525
Totals on hand	211,304	3,038	479	214,821
Afloat				
Manufacturers	13,571	....	....	13,571
Importers and dealers	32,956	243	....	33,199
Totals afloat	46,527	243	....	46,770

* Number of rubber manufacturers that reported data was 166; crude rubber importers and dealers, 45; reclaimers (solely), 5; total daily average number of employes on basis of third week of July, 1931, was 113,291.

It is estimated that the reported grand total crude rubber consumption and the grand total sales value figures to be approximately 92 per cent; the grand total crude rubber inventory 84 per cent, and afloat figures 76 per cent; the reclaimed rubber production 95 per cent; reclaimed consumption 86 per cent; and reclaimed inventory 85 per cent of the total of the entire industry.

† One company did not report its sales, but did report crude rubber consumption, stocks, etc.

Compiled from statistics supplied by The Rubber Manufacturers Association, Inc.

Malayan Estate Acreage Out of Tapping

At the end of 1930 Malayan officials estimated that of 920,112 acres planted to rubber in the F. M. S., 133,213 acres were out of tapping on estates which had wholly or partly ceased production. Out of 214,147 acres in the S. S., it was estimated 32,373 acres were out of tapping. At the end of August corresponding out of tapping statistics were F. M. S. 140,915 acres, and S. S. 51,714 acres, a slight increase for F. M. S. and an increase of 60 per cent for S. S.

Dominion of Canada Statistics

Imports of Crude and Manufactured Rubber

	September, 1931		Six Months Ended September, 1931	
Unmanufactured	Pounds	Value	Pounds	Value
Rubber, gutta percha, etc.	3,438,177	$194,120	29,926,774	$2,067,475
Rubber, recovered	451,600	20,821	4,394,300	201,516
Rubber and gutta percha scrap	87,000	1,284	1,089,600	22,996
Balata	58	12	4,766	3,650
Rubber substitute	53,800	6,488	182,700	21,366
Totals	4,030,635	$222,725	35,598,140	$2,317,003
Partly Manufactured				
Hard rubber sheets and rods	1,850	$1,199	9,443	$5,945
Hard rubber tubes	.....	345	.....	991
Rubber thread not covered	13,902	10,540	142,471	119,127
Totals	15,752	$12,084	151,914	$126,063
Manufactured				
Belting	.....	$6,296	.....	$48,043
Hose	.....	3,374	.....	36,525
Packing	.....	2,928	.....	27,548
Boots and shoes, *pairs*	197	498	20,206	8,487
Clothing, including waterproofed	.....	4,414	.....	32,616
Raincoats	1,029	4,467	15,154	41,788
Gaskets	.....	.....	.....	.....
Gloves	.....	1,389	.....	9,553
Hot water bottles	.....	3,284	.....	11,886
Tires, bicycle, *number*	1,957	842	34,092	16,370
Pneumatic, *number*	1,922	17,111	32,264	194,430
Inner tubes, *number*	752	738	9,171	9,072
Solid for automobiles and motor trucks, *number*	82	3,443	391	12,844
Other solid tires	.....	1,341	.....	12,844
Mats and matting	.....	1,328	.....	19,986
Cement	.....	5,142	.....	35,720
Golf balls, *dozen*	2,107	7,717	34,160	103,942
Heels, *pairs*	51,812	1,249	332,564	9,899
Other rubber manufactures	.....	92,227	.....	609,398
Totals	.....	$157,788	.....	$1,240,951
Totals, rubber imports	.....	$392,597	.....	$3,684,017

Exports of Domestic and Foreign Rubber Goods

	Produce of Canada Value	Reexports of Foreign Goods Value	Produce of Canada Value	Reexports of Foreign Goods Value
Unmanufactured				
Waste rubber	$4,163	.....	$27,036	.....
Manufactured				
Belting	$16,387	.....	$137,603	.....
Canvas shoes with rubber soles	77,391	.....	1,187,408	.....
Boots and shoes	325,174	.....	1,211,724	.....
Clothing, including waterproofed	2,587	.....	24,262	.....
Hose	6,104	.....	64,956	.....
Tires, bicycle	84	.....	5,075	.....
Pneumatic	461,384	.....	3,127,203	.....
Inner tubes	36,455	.....	309,859	.....
Solid	95	.....	2,027	.....
Other rubber manufactures	170,749	$3,660	768,951	$16,906
Totals	$1,096,410	$3,660	$6,839,068	$16,906
Totals, rubber exports	$1,100,573	$3,660	$6,866,104	$16,906

World Rubber Shipments—Net Exports

	Long Tons					
	Calendar Years		1931			
	1929	1930	Aug.	Sept.	Oct.	Nov.
British Malaya						
Gross exports	579,524	547,043	42,832	44,336	45,911	48,012
Imports	161,612	133,876	9,063	8,369	9,955	9,529
Net	417,912	413,167	33,769	35,967	35,956	38,483
Ceylon	80,795	76,406	3,763	*4,202	*5,105	*4,858
India and Burma	11,720	10,782	406	169	286	....
Sarawak	11,079	10,310	692	701	872	830
British No. Borneo	7,381	7,052	*500	*500	*500	*500
Siam	5,024	4,349	210	218	338	390
Java and Madura	66,010	69,755	6,397	5,578	8,086	....
Sumatra E. Coast	87,589	79,396	7,044	7,358	7,882	....
Other N. E. Indies	134,732	115,254	8,641	8,389	9,547	....
French Indo-China	10,147	9,877	1,097	*922	*844	*944
Amazon Valley	21,148	14,260	856	745	1,284	872
Other America	996	516	....	....	....	....
Guayule	1,275	1,095	....	....	....	....
Africa	4,596	3,961	241	*170	*150	*150
Totals	860,404	816,180	63,616	64,919	70,850	....

* Estimate. *Compiled by Rubber Division, Department of Commerce, Washington, D. C.*

CLASSIFIED ADVERTISEMENTS

SITUATIONS WANTED

RUBBER CHEMIST OR ASSISTANT SUPERINTENDENT, WITH years of practical experience here and abroad, is looking for a new permanent connection. Familiar with laboratory research, development, and factory control work. Experienced in the manufacture of tires, tubes, hose, druggists' sundries, coated fabrics, tapes for various purposes, hot and cold plastics, footwear, and the application of latex in dipped goods. Very best references. Would go abroad. Address Box No. 11,077, care of INDIA RUBBER WORLD.

TIRE DEVELOPMENT ENGINEER, WITH TEN YEARS' EXPERIence. Thoroughly experienced all modern methods construction and manufacturing high grade tires. Available January 1. Address Box No. 11,078, care of INDIA RUBBER WORLD.

MECHANICAL ENGINEER, VARIED EXPERIENCE IN PLANT maintenance, tire and mechanical mold equipment manufacturing, tire development engineering, superintendent of production. Producing at minimum costs. Let me convince you by personal interview or reference. Address Box No. 11,079, care of INDIA RUBBER WORLD.

RUBBER CHEMIST, AGE THIRTY-SEVEN, SINGLE, FIFTEEN years' varied experience in the analysis, compounding, control, testing and reclaiming of rubber goods, is available for any suitable position. Address Box No. 11,080, care of INDIA RUBBER WORLD.

YOUNG MAN, TWENTY-SEVEN, ASSISTANT SUPERINTENDENT or junior executive, six years' experience production, factory development and research with large corporations, tires, tubes, sundries, packings, brake linings. Knowledge compounding. Moderate salary. Fine record and references. Available January 1. Address Box No. 11,082, care of INDIA RUBBER WORLD.

SUPERINTENDENT OR CHIEF CHEMIST. THOROUGHLY EXperienced in the manufacture of both soft and hard rubber products. Have been with the best companies as chief chemist and superintendent over research, development and plant management. Have specialized on accelerators and compounding. Best of references, married, age forty-two, seventeen years' experience. Mechanical goods preferred. Address Box No. 11,085, care of INDIA RUBBER WORLD.

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FOR YOUR CONVENIENCE

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Gentlemen:—

I would like to have a complete file of INDIA RUBBER WORLD to keep at my residence. Enclosed please find $3.00 in full payment for the next 12 issues which please send to my home address as follows:

Name .....

Street .....

City ..... State .....

My position is ..... with ..... Company

(*Advertisements continued on page* 105)

World Rubber Absorption—Net Imports

Long Tons

	Calendar Years		1931		
	1929	1930	Aug.	Sept.	Oct.
CONSUMPTION					
United States	472,000	376,107	27,828	23,845	22,473
United Kingdom	72,023	74,760	4,192	8,152	6,559
NET IMPORTS					
Australia	15,886	5,354	283	269	765
Austria	3,324	2,365	390	58	‡33
Belgium	9,445	10,740	955	1,015	.....
Canada	35,453	28,793	2,304	1,535	1,567
Czechoslovakia	4,650	4,532	413	499	695
Denmark	799	1,147	59	65	84
Finland	976	1,262	21	154	127
France	59,342	68,503	3,393	4,420	3,909
Germany	49,078	45,488	2,889	4,227	3,220
Italy	17,169	18,570	812	693	571
Japan	34,284	32,731	3,780	5,556	3,980
Netherlands	3,022	2,924	‡57	191	185
Norway	813	1,143	46	53	66
Russia	12,626	16,229	3,137	5,734	.....
Spain	2,400	2,400	160	99	193
Sweden	3,857	4,414	195	299	433
Switzerland	653	808	57	83	66
Others estimated†	7,000	7,200	*800	*800	*800
Totals	804,800	705,470	51,771	57,747	.....
Minus United States (Cons.)	472,000	376,107	27,828	23,845	22,473
Total foreign	332,800	329,363	23,943	33,902	.....

*Estimate to complete table. †Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, and Union of South Africa.
‡Indicating excess of reexports over imports.
Compiled by Rubber Division, Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for November, 1931:

Rubber Exports

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

	November, 1931	
To	Sheet and Crepe Rubber Tons	Latex Concentrated Latex and Revertex Tons
United Kingdom	4,242	59
United States	36,049	68
Continent of Europe	3,852	107
British possessions	687	5
Japan	2,158	2
Other countries	781	2
Totals	47,769	243

Rubber Imports

Actual Imports by Land and Sea

	November, 1931	
From	Dry Rubber Tons	Wet Rubber Tons
Sumatra	442	4,409
Dutch Borneo	328	2,138
Java and other Dutch Islands	60	17
Sarawak	802	28
British Borneo	251	26
Burma	224	9
Siam	173	217
French Indo China	298	28
Other countries	69	10
Totals	2,647	6,882

United States Crude and Waste Rubber Imports for 1931 by Months

	Plantations	Latex	Paras	Africans	Centrals	Guayule	Manicobas and Matto Grosso	Totals 1931	Totals 1930	Balata	Miscellaneous	Waste
January ...tons	36,525	206	331	36	..	..	..	37,098	47,362	65	960	38
February	35,749	339	516	40	1	..	..	36,645	43,728	1	580	..
March	38,922	352	1,062	2	..	..	..	40,338	45,430	170	800	..
April	46,034	323	291	..	..	..	..	46,648	49,927	196	908	60
May	30,962	248	508	2	..	..	..	31,720	40,745	78	450	2
June	44,495	601	640	40	..	..	..	45,776	42,653	271	892	6
July	40,477	316	211	..	..	..	..	41,004	34,084	131	519	6
August	37,920	328	121	1	..	..	..	38,370	34,558	82	375	13
September	39,831	341	294	39	..	..	..	40,505	39,467	89	592	20
October	40,462	238	695	..	..	..	..	41,395	43,729	28	719	36
November	43,079	208	410	36	..	..	..	43,733	31,765	76	652	..
Total, eleven months, 1931 ...tons	434,456	3,500	5,079	196	1	..	..	443,232	.....	1,187	7,447	181
Total, eleven months, 1930 ...tons	441,573	3,750	6,579	337	198	1,011	..	.....	453,448	1,189	7,960	462

Compiled from Rubber Manufacturers Association statistics.

Tire Production Statistics

Pneumatic Casings—All Types

	Inventory	Production	Total Shipments
1928	**10,217,708**	**58,457,873**	**55,721,937**
1929	**9,470,368**	**54,980,672**	**55,515,884**
1930	**7,202,750**	**40,772,378**	**42,913,108**
1931			
January	**7,165,846**	**2,939,702**	**2,995,479**
February	7,628,520	3,188,274	2,721,347
March	8,011,592	3,730,061	3,297,225
April	8,025,135	3,955,491	3,945,525
May	**8,249,856**	**4,543,003**	**4,332,137**
June	8,357,768	4,537,970	4,457,509
July	7,935,565	3,941,187	4,369,526
August	7,117,037	3,124,746	3,967,987
September	6,526,762	2,537,575	3,145,488
October	6,640,052	2,379,004	2,261,322

Solid and Cushion Tires

	Inventory	Production	Total Shipments
1928	**152,120**	**508,223**	**512,602**
1929	**122,200**	**407,347**	**436,027**
1930	**75,871**	**204,340**	**250,635**
1931			
January	75,205	12,631	13,072
February	73,338	11,358	12,915
March	68,584	11,424	16,152
April	64,369	11,610	15,445
May	61,272	11,369	15,560
June	57,462	11,764	15,364
July	54,692	13,370	16,051
August	50,994	11,643	15,758
September	45,995	10,371	12,786
October	42,861	11,132	13,621

Inner Tubes—All Types

	Inventory	Production	Total Shipments
1928	**12,087,464**	**60,131,381**	**57,845,189**
1929	**10,245,365**	**55,062,886**	**56,473,303**
1930	**7,999,477**	**41,936,029**	**43,952,139**
1931			
January	**7,551,503**	**2,898,405**	**3,249,734**
February	**7,936,773**	**3,132,770**	**2,720,135**
March	**8,379,974**	**3,559,644**	**3,031,279**
April	**8,330,155**	**3,693,222**	**3,708,949**
May	**8,438,799**	**4,329,731**	**4,224,594**
June	**8,403,401**	**4,286,467**	**4,317,543**
July	**7,671,801**	**3,964,174**	**4,664,964**
August	**7,019,217**	**3,548,335**	**4,240,403**
September	**6,476,191**	**2,759,431**	**3,320,103**
October	**6,656,913**	**2,461,578**	**2,250,494**

	Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires		Consumption of Motor Gasoline (100%) Gallons
	Cotton Fabric Pounds	Crude Rubber Pounds	
1928	**222,243,398**	**600,423,401**	**13,633,452,000**
1929	**208,824,653**	**598,994,708**	**14,748,552,000**
1930	**158,812,462**	**476,755,707**	**16,200,894,000**
1931			
January	12,738,467	36,318,980	1,127,532,000
February	12,002,161	36,651,119	1,097,208,000
March	14,040,803	41,850,638	1,303,302,000
April	15,243,625	45,016,344	1,402,800,000
May	18,009,764	53,417,709	1,499,904,000
June	17,084,749	51,279,827	1,611,540,000
July	15,139,769	46,696,925	1,657,446,000
August	11,745,425	36,231,633	1,657,278,000
September	9,584,599	29,854,183	1,543,500,000
October	9,262,999	28,371,957	1,472,142,000

Rubber Manufacturers Association figures representing 80 per cent of the industry since January, 1929, with the exception of gasoline consumption.

Classified Advertisements

CONTINUED

MACHINERY AND SUPPLIES WANTED

WANTED: SPREADERS OF ANY WIDTH AND IN ANY CONDITION. Address Box No. 11,083, care of INDIA RUBBER WORLD.

United States Statistics

Imports of Crude and Manufactured Rubber

	September, 1931		Nine Months Ended September, 1931	
UNMANUFACTURED—*Free*	Pounds	Value	Pounds	Value
Crude rubber	86,226,053	$4,970,324	801,097,800	$57,763,020
Liquid latex	982,992	72,443	8,591,787	758,697
Jelutong or pontianak	912,503	65,232	9,952,121	831,072
Balata	282,575	35,174	2,192,684	348,492
Gutta percha	28,448	2,763	261,879	31,462
Siak, scrap, and reclaimed	675,807	8,920	6,737,719	67,044
Totals	89,108,378	$5,154,856	828,833,990	$59,799,787
Chicle, crude *Free*	441,186	$207,712	6,913,919	$3,256,353
MANUFACTURED—*Dutiable*				
Tires *number*	2,771	$1,651	24,394	$59,481
Other rubber manufactures	.....	59,284	.....	632,075
Totals	.....	$60,935	.....	$691,556

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	3,051,588	$187,431	44,975,699	$3,517,200
Balata	4,453	921	91,880	23,928
Guayule	.....	.....	31,400	4,398
Gutta percha, rubber substitutes, and scrap	2,400	252	12,522	2,054
Rubber manufactures	.....	5,524	.....	18,465
Totals	.....	$194,128	.....	$3,566,045

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,157,419	$51,096	12,203,636	$573,969
Scrap and old	3,781,734	80,006	39,017,116	877,614
Rubberized automobile cloth *sq. yd.*	63,953	27,739	722,520	319,849
Other rubberized piece goods and hospital sheeting *sq. yd.*	92,799	33,202	922,325	375,755
Footwear				
Boots *pairs*	105,488	214,675	492,942	1,139,877
Shoes *pairs*	139,097	136,082	683,033	528,155
Canvas shoes with rubber soles *pairs*	62,635	38,128	1,296,784	816,659
Soles *doz. pairs*	10,564	24,108	69,322	179,485
Heels *doz. pairs*	55,318	32,524	581,937	378,743
Water bottles and fountain syringes *number*	57,457	27,954	289,801	132,104
Gloves *doz. pairs*	7,677	17,856	71,478	176,780
Other druggists' sundries	.....	23,857	.....	243,234
Balloons *gross*	49,563	45,354	479,725	434,059
Toys and balls	.....	9,926	.....	95,238
Bathing caps *doz.*	2,047	3,319	109,198	212,889
Bands	41,433	13,826	358,858	131,640
Erasers	26,621	15,655	316,727	189,878
Hard rubber goods				
Electrical goods	111,570	11,881	971,994	108,911
Other goods	.....	16,886	.....	182,923
Tires				
Truck and bus casings, *number*	25,935	505,680	305,235	6,097,337
Other automobile casings, *number*	100,361	784,294	1,144,455	8,713,976
Tubes, auto *number*	79,752	109,201	945,002	1,275,841
Other casings and tubes, *number*	5,841	14,585	67,651	143,938
Solid tires for automobiles and motor trucks *number*	1,163	37,203	9,442	304,327
Other solid tires	100,841	12,947	1,216,017	165,462
Tire sundries and repair materials	.....	59,662	.....	650,990
Rubber and friction tape	57,804	15,585	863,702	235,429
Belting	255,858	106,047	2,615,780	1,142,639
Hose	303,062	90,493	3,832,065	1,134,492
Packing	80,520	31,784	1,008,826	417,838
Thread	120,661	74,944	1,148,440	929,091
Other rubber manufactures	.....	129,508	.....	1,279,318
Totals	.....	$2,796,007	.....	$29,588,440

Crude Rubber Imports by Customs Districts

Including latex dry rubber content

	October, 1931		October, 1930	
	Pounds	Value	Pounds	Value
Massachusetts	5,238,051	$285,073	4,100,018	$389,808
New York	74,303,423	3,904,870	95,969,835	9,235,426
Philadelphia	.....	.....	49,422	4,693
Maryland	7,959,752	398,456	78,120	6,933
New Orleans	.....	.....	1,076,829	86,559
Los Angeles	4,195,042	201,463	1,945,084	201,556
San Francisco	470,400	25,126	235,287	30,304
Oregon	11,200	743	46,840	4,921
Ohio	.....	.....	265,479	23,234
Colorado	554,400	31,089	112,000	10,183
Totals	92,732,268	$4,846,820	103,878,914	$9,993,617

United Kingdom Statistics

Imports

	October, 1931		Ten Months Ended October, 1931	
UNMANUFACTURED Crude Rubber from	Pounds	Value	Pounds	Value
Straits Settlements	10,992,300	£135,475	118,660,500	£1,714,487
Federated Malay States	5,481,300	72,926	52,541,500	811,945
British India	450,300	5,279	10,649,500	156,476
Ceylon and Dependencies	1,192,700	14,252	20,070,800	302,480
Java and Dutch Borneo	2,277,700	32,145	25,302,000	384,158
Sumatra and other Dutch possessions in Indian Seas	852,600	10,650	13,153,100	203,806
Other countries in East Indies and Pacific not elsewhere specified	421,300	5,516	3,302,000	50,370
Brazil	348,500	4,611	4,365,700	80,580
South and Central America (except Brazil)	.....	.....	42,400	595
West Africa				
French West and Equatorial Africa	4,500	104	29,900	548
Gold Coast	.....	.....	175,500	2,666
Other parts of West Africa	29,700	339	1,602,600	23,887
East Africa, including Madagascar	.....	.....	184,500	2,940
Other countries	48,300	842	1,032,700	18,523
Totals	22,099,200	£282,139	251,112,700	£3,753,461
Gutta percha and balata	245,200	16,936	2,552,600	174,793
Waste and reclaimed rubber	808,700	8,215	6,529,600	61,567
Rubber substitutes, synthetic	2,200	46	15,900	416
Totals	23,155,300	£307,336	260,210,800	£3,990,237
MANUFACTURED				
*Tires and tubes				
Pneumatic				
Outer covers	.....	£27,999	.....	£188,653
Inner tubes	.....	12,360	.....	61,809
Solid tires	.....	3,133	.....	33,774
Boots and shoes *doz. pairs*	90,385	182,561	1,055,104	1,334,620
Other rubber manufactures	.....	212,521	.....	1,527,546
Totals	.....	£438,574	.....	£3,146,402

Exports

UNMANUFACTURED				
Waste and reclaimed rubber	1,425,300	£7,796	12,252,300	£76,112
Rubber substitutes, synthetic	67,800	1,234	377,900	7,302
Totals	1,493,100	£9,030	12,630,200	£83,414
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£207,794	.....	£2,426,963
Inner tubes	.....	24,525	.....	293,782
Solid tires	.....	4,755	.....	46,675
Boots and shoes *doz. pairs*	12,219	21,397	153,216	202,363
Other rubber manufactures	.....	161,165	.....	1,631,346
Totals	.....	£419,636	.....	£4,601,129

Exports—Colonial and Foreign

UNMANUFACTURED				
Crude Rubber				
To				
Soviet Union (Russia)	4,607,000	£68,056	25,852,000	£572,148
Sweden, Norway, and Denmark	397,200	6,918	1,953,700	38,644
Germany	1,882,600	24,898	16,432,900	259,966
Belgium	845,100	14,449	8,568,800	140,346
France	770,900	12,659	12,718,700	229,630
Spain	118,000	3,285	953,700	25,417
Italy	59,800	1,730	3,119,000	51,255
Other countries in Europe	258,800	5,887	2,956,300	66,941
United States	22,700	571	1,966,900	43,095
Other countries	200,800	4,079	1,380,700	32,858
Totals	9,162,900	£142,532	75,902,700	£1,460,300
Gutta percha and balata	46,400	3,644	444,200	38,720
Waste and reclaimed rubber	7,900	137	169,900	2,449
Rubber substitutes, synthetic	.....	.....	1,400	18
Totals	9,217,200	£146,313	76,518,200	£1,501,487
MANUFACTURED				
Tires and tubes				
Pneumatic				
Outer covers	.....	£2,496	.....	£60,783
Inner tubes	.....	249	.....	3,426
Solid tires	.....	.....	.....	215
Boots and shoes *doz. pairs*	3,282	8,695	24,724	35,047
Other rubber manufactures	.....	5,270	.....	50,837
Totals	.....	£16,710	.....	£150,308

*Motor cars, motorcycles, parts and accessories, liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until Apr. 30, 1926, inclusive, and tires and tubes until Apr. 11, 1927, inclusive.

Scrap Exports Larger

In the first 9 months of 1931 scrap rubber exports were 39,018,084 lbs., compared with 37,690,203 lbs. for the similar period in 1930. In the former period the value was $1,376,556, and in the latter $877,690. Spain is the largest consumer.

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Wood, Chas. E., Inc., New York, N. Y.

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Rand Rubber Co., Inc., Brooklyn, N. Y.

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Plymouth Rubber Co., Inc., Canton, Mass.

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Albert, L., & Son, Trenton, N. J.
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Utility Manufacturing Co., Cudahy, Wis.

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Utility Manufacturing Co., Cudahy, Wis.

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Mears-Kane-Ofeldt, Philadelphia, Pa.

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Mears-Kane-Ofeldt, Philadelphia, Pa.

BOILERS.
Akron Equipment Co., The, Akron, Ohio.
Mears-Kane-Ofeldt, Philadelphia, Pa.

BOOTS AND SHOES.
Gutta Percha & Rubber, Ltd., Toronto, Canada.

BRAIDERS—Hose.
Albert, L., & Son, Trenton, N. J.
New England Butt Co., Providence, R. I.

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Garlock Packing Co., The, Palmyra, N. Y.
Thermoid Rubber Co., Trenton, N. J.

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Naugatuck Chemical Co., New York, N. Y.

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Plantation Rubber Crop Returns by Months

Summary of 615 Producing Companies

	Br. N. Borneo (26 Companies)		Ceylon (102 Companies)		India and Burma (21 Companies)		Malaya (338 Companies)		Netherlands East Indies — Java (60 Companies)		Netherlands East Indies — Sumatra (60 Companies)		Miscellaneous (8 Companies)		Total (615 Companies)	
	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index	Long Tons	Index
1931																
January	473	96.7	1,776	87.0	397	70.6	13,006	104.6	3,020	115.0	4,324	107.2	225	124.3	23,221	103.8
February	365	74.6	1,138	55.8	160	28.5	11,551	92.9	2,631	100.2	3,721	92.3	130	71.8	19,696	88.1
March	378	77.3	1,065	52.2	510	90.7	11,439	92.0	3,174	120.9	4,173	103.5	182	100.6	20,921	93.6
April	351	71.8	1,699	83.2	672	119.6	10,423	83.8	3,069	116.9	3,726	92.4	208	114.9	20,148	90.1
May	428	87.5	1,340	65.7	655	116.5	11,669	93.8	3,235	123.2	4,076	101.1	207	114.4	21,610	96.6
June	411	84.0	888	43.5	232	41.3	11,752	94.5	3,043	115.9	4,224	104.8	208	114.9	20,758	92.8
July	403	82.4	1,234	60.5	213	37.9	13,249	106.6	3,042	115.8	4,476	111.0	213	117.7	22,830	102.1
August	410	83.8	1,137	55.7	108	19.2	13,081	105.2	2,340	89.1	4,563	113.2	209	115.5	21,848	97.7
September	358	73.2	1,301	63.7	283	50.4	12,674	101.9	2,368	90.2	4,515	112.0	187	103.3	21,686	97.0
October	366	74.8	1,507	73.8	339	60.3	13,290	106.9	2,730	104.0	4,751	117.8	200	110.5	23,183	103.7
November	367	75.1	1,432	70.2	339	60.3	13,091	105.3	2,881	109.7	4,665	115.7	199	109.9	22,974	102.7
Eleven months ending November, 1931	4,310	..	14,517	.	3,908	...	135,225	....	31,533	. .	47,214	. .	2,168	. .	238,875	....

NOTE. Index figures throughout are based on the monthly average for 1929 = 100. Issued December 10, 1931, by the Commercial Research Department, The Rubber Growers' Association, Inc., London, England.

Rubber Goods Production Statistics

		1931										1930		
TIRES AND TUBES		Oct.	Sept.	Aug.	July	June	May	Apr.	Mar.	Feb.	Jan.	Dec.	Nov.	Oct.
Pneumatic casings														
Production	thousands		2,538	3,125	3,941	4,538	4,543	3,955	3,730	3,188	2,940	2,251	2,123	2,866
Shipments														
Domestic	thousands	....	3,034	3,845	4,244	4,320	4,197	3,804	3,143	2,580	2,855	2,550	2,119	2,613
Exports	thousands	....	111	123	125	137	135	142	155	142	140	139	148	186
Stocks, end of month	thousands	....	6,527	7,117	7,936	8,358	8,250	8,025	8,012	7,629	7,166	7,203	7,676	7,842
Solid and cushion tires														
Production	thousands	....	10	12	13	12	11	12	11	11	13	13	13	18
Shipments														
Domestic	thousands	....	12	15	15	14	14	14	15	12	12	12	13	19
Exports	thousands	....	1	1	1	1	1	1	1	1	1	1	1	1
Stocks, end of month	thousands	....	46	51	55	57	61	64	69	73	75	76	76	78
Inner tubes														
Production	thousands	....	2,759	3,548	3,964	4,286	4,330	3,693	3,560	3,133	2,898	2,448	2,144	3,161
Shipments														
Domestic	thousands	....	3,247	4,158	4,569	4,228	4,135	3,610	2,922	2,619	3,147	2,634	2,147	2,659
Exports	thousands	....	73	82	96	89	89	99	109	101	102	96	84	116
Stocks, end of month	thousands	....	6,476	7,019	7,672	8,403	8,439	8,330	8,380	7,937	7,552	7,999	8,250	8,414
Raw material consumed														
Fabrics	thous. of lbs.	....	9,585	11,745	15,140	17,085	18,010	15,244	14,041	12,002	12,738	8,358	8,418	11,780
Crude rubber	thous. of lbs.	....	29,854	36,232	46,697	51,280	53,418	45,016	41,851	36,651	36,319	25,537	26,253	36,097
MISCELLANEOUS RUBBER PRODUCTS														
Calendered rubber clothing														
Net orders	no. coats and sundries	20,925	23,966	21,580	17,932	21,161	19,380	16,846	19,380	16,361	21,884	12,881	15,493	25,082
Production	no. coats and sundries	19,773	22,728	27,080	14,431	15,419	18,094	16,803	19,220	18,276	13,059	20,791	22,623	41,291
Mechanical rubber goods, shipments														
Belting	thous. of dollars	....	788	802	914	798	790	832	889	722	759	675	779	954
Hose	thous. of dollars	....	1,041	1,161	1,436	1,650	1,857	2,129	1,892	1,611	1,440	1,337	1,276	1,554
All other	thous. of dollars	...	1,186	1,393	1,356	1,431	1,584	1,656	1,631	1,378	1,400	1,326	1,345	1,678
Total	thous. of dollars	....	3,015	3,356	3,706	3,879	4,231	4,617	4,412	3,711	3,599	3,338	3,400	4,186
Rubber bands, shipments	thous. of lbs.		201	195	246	209	215	259	231	222	211	165	165	197
Rubber flooring, shipments	thous. of sq. ft.	550	595	595	577	576	569	569	496	366	365	597	432	682
Rubber and canvas footwear														
Tennis														
Production	thous. of pairs	..	1,012	1,021	836	1,999	2,142	2,591	2,609	2,492	2,409	1,875	1,940	1,821
Shipments, domestic	thous. of pairs		1,263	1,223	1,520	2,657	3,316	4,049	3,107	2,688	2,377	871	319	562
Exports	thous. of pairs		72	29	125	100	121	150	236	200	110	175	148	263
Stocks	thous. of pairs	....	5,473	5,704	5,957	6,766	7,523	8,833	10,328	11,047	11,447	11,633	10,712	9,239
Waterproof, total														
Production	thous. of pairs		2,922	2,361	1,570	1,922	1,261	1,102	874	958	1,272	2,214	2,736	2,960
Shipments, domestic	thous. of pairs		4,185	2,842	1,510	1,229	626	1,070	944	1,015	1,549	3,888	4,212	5,299
Exports	thous. of pairs		186	151	117	108	50	72	53	92	74	63	135	287
Stocks	thous. of pairs		15,141	16,366	16,978	17,024	16,357	15,733	15,803	16,030	16,179	17,172	18,449	20,054
Grand total														
Production	thous. of pairs	..	3,934	3,382	2,407	3,921	3,402	3,693	3,483	3,450	3,681	4,089	4,675	4,781
Shipments, domestic	thous. of pairs	....	5,448	4,065	3,030	3,886	3,942	5,119	4,050	3,704	3,926	4,759	4,531	5,861
Exports	thous. of pairs		258	180	242	208	171	222	288	292	184	237	282	550
Stocks	thous. of pairs	....	20,615	22,070	22,935	23,789	23,881	24,566	26,130	27,077	27,627	28,806	29,160	29,293
Rubber heels														
Production	thous. of pairs	..	15,827	16,293	15,361	17,093	15,474	15,408	14,661	13,156	12,973	13,101	11,083	16,460
Shipments														
Exports	thous. of pairs	....	501	514	540	630	612	578	577	658	748	838	880	966
Repair trade	thous. of pairs	...	6,994	5,355	4,058	4,946	3,975	4,038	4,868	4,854	3,939	3,450	4,473	8,291
Shoe manufacturers	thous. of pairs	..	9,724	11,653	11,177	10,522	9,693	10,112	10,991	8,397	8,471	6,618	4,578	9,354
Stocks, end of month	thous. of pairs	...	23,952	25,832	27,006	27,898	28,491	27,764	26,708	29,335	30,302	29,741	29,130	29,353
Rubber-proofed fabrics, production														
Auto fabrics	thous. of yds.	..	528	596	531	701	982	710	738	644	577	476	532	915
Raincoat fabrics	thous. of yds.	2,476	2,988	2,226	1,843	1,355	1,066	1,040	863	567	738	697	1,426	3,040
All other	thous. of yds.	1,191	1,176	965	963	1,156	1,002	1,271	1,168	973	891	736	864	1,254
Total	thous. of yds.		4,692	3,787	3,337	3,212	3,050	3,381	2,769	2,184	2,206	1,909	2,822	5,209
Rubber soles														
Production	thous. of pairs	..	2,880	2,933	2,864	3,177	2,885	2,692	2,292	2,724	2,481	3,021	1,426	3,056
Shipments														
Exports	thous. of pairs	....	90	67	67	59	62	69	14	36	11	58	60	82
Repair trade	thous. of pairs	....	290	234	196	225	330	255	408	290	287	243	280	492
Shoe manufacturers	thous. of pairs	....	2,604	2,790	2,569	2,899	2,651	2,474	2,145	2,259	2,090	2,305	1,011	2,638
Stocks, end of month	thous. of pairs	....	2,264	2,395	2,475	2,461	2,655	2,764	2,876	3,167	3,032	2,917	2,390	2,520

Source: *Survey of Current Business*, Bureau of Foreign and Domestic Commerce, Washington, D. C.